

PD-ABM-231  
97467

**THE RAPTI DEVELOPMENT PROJECT**

**FINAL EVALUATION**  
(Project No. 367-0155)

Prepared for:

*USAID/Nepal*  
*Under the Agriculture & Food Systems IQC*  
*with*  
*International Science & Technology Institute, Inc.*

by:

**John Mellor Associates, Inc.**  
Washington, D.C.  
and  
**Institute for Integrated Development Studies**  
Kathmandu, Nepal

February 1995

## CONTENTS

<b>List of Tables</b>	<b>iii</b>
<b>List of Figures</b>	<b>v</b>
<b>Project Identification Data</b>	<b>vii</b>
<b>Executive Summary</b>	<b>ix</b>
<b>Acknowledgement</b>	<b>xxv</b>
<b>Acronyms</b>	<b>xxvii</b>
<b>1. Introduction</b>	<b>1</b>
<b>Rapti Zone</b>	<b>1</b>
<b>Project Objectives</b>	<b>4</b>
<b>Strategy and Approach</b>	<b>4</b>
<b>Implementation History</b>	<b>4</b>
<b>Method of Evaluation</b>	<b>6</b>
<b>2. Project Output Areas</b>	<b>9</b>
<b>Farm and Forest Productivity</b>	<b>9</b>
<b>Local Group and Private Enterprise Capacity</b>	<b>52</b>
<b>District Institutional Development</b>	<b>63</b>
<b>3. Project Input Areas</b>	<b>71</b>
<b>HMG Line Agencies</b>	<b>71</b>
<b>Project Coordination Office</b>	<b>76</b>
<b>Technical Assistance</b>	<b>77</b>
<b>Evaluations and Special Studies</b>	<b>85</b>
<b>Training</b>	<b>87</b>
<b>4. Integrated Activities</b>	<b>89</b>
<b>Local Involvement</b>	<b>89</b>
<b>Policy</b>	<b>92</b>
<b>5. Project Design</b>	<b>99</b>

<b>6.</b>	<b><i>Budget History</i></b>	<b>103</b>
<b>7.</b>	<b><i>Conclusion and Recommendations</i></b>	<b>107</b>
	<b>Institutional Development</b>	<b>108</b>
	<b>Local Involvement</b>	<b>109</b>
	<b>Forestry and Soil Conservation</b>	<b>110</b>
	<b>Agriculture</b>	<b>113</b>
	<b>Other Issues</b>	<b>120</b>
	 <b><i>References</i></b>	 <b>125</b>
	 <b><i>Annexes</i></b>	
	<b>Annex 1 — Evaluation Scope of Work</b>	<b>131</b>
	<b>Annex 2 — Evaluation Team</b>	<b>135</b>
	<b>Annex 3 — People Contacted</b>	<b>137</b>
	<b>Annex 4 — Organization (Planning and Monitoring Process of RDP)</b>	<b>151</b>
	<b>Annex 5 — Tables 1-27: Area, Production and Yield of Cereals and Cash Crops</b>	<b>153</b>
	<b>Annex 6 — Maps: Physiographic Region</b>	<b>163</b>

## LIST OF TABLES

2-1. Increase in Production of Major Field Crops, Terai and Dang District, 1976/77 to 1990/91	13
2-2. Increase in Production of Major Field Crops, Hills, Rapti and Salyan District, 1976/77 to 1990/91	14
2-3. Proportion of Households Achieving Food Self-sufficiency, 1989/90 and 1992/93	15
2-4. Cash Income by Sources, 1989/90 to 1992/93	16
2-5. Percent Increase and Cash Income by Source, 1989/90 to 1992/93	16
2-6. Crop Cut Yield and Net Income, Thapagaon and Chakhaura	18
2-7. Yield of Rice, Maize and Wheat, Nepal, Rapti Zone and Five Districts 1987/88 to 1991/92	21
2-8. Yield of Cash Crops, Nepal, Rapti Zone and Five Districts, 1987/88 to 1991/92	21
2-9. Land Use, Nepal, Rapti Zone and Districts, 1986	31
2-10. Growth Rates, Commercial Production and Cash Sales, Vegetables, Fruit, and Cash Crops, Rapti Zone, 1989-1993	55
3-11. Agriculture Expenditure and USAID Contribution, 1987/88-1993/94	73
3-12. Devres/New Era/Winrock Technical Assistance Level of Effort, 1990/91-1994/95	79
3-13. Agricultural Development Bank Appropriate Technology and Private Enterprise Development Center, Dang, Achievement and Impact, 1989-1994	82
6-14. Cumulative Rapti Development Project Financial Status, 1994	104
6-15. Summary of Rapti Zone Rural Area Development Project Expenditures, Phase I	105

## **LIST OF FIGURES**

<b>Figure 2-1. Map Showing the General Spread of Forestry and Soil and Water Conservation Activities in Rapti Zone.</b>	<b>10</b>
<b>Figure 2-2. Map Showing the General Spread of Agriculture, Horticulture and Livestock Activities in Rapti Zone.</b>	<b>11</b>
<b>Figure 2-3. Map of Rapti Zone Showing Road Network.</b>	<b>12</b>

## PROJECT IDENTIFICATION DATA

**Country** : Nepal  
**Project Title** : Rapti Development Project  
**Project Number** : 367-0155  
a. First Project Agreement : July 13, 1987  
b. Project Assistance Completion Data : July 30, 1995  
c. Last Obligation Made : April 27, 1993  
d. Total Obligation Made : 18.2 million

### *Original Project Funding*

a. AID Bilateral Funding : \$18.8 million  
b. Peace Corps : 1.9 million  
c. His Majesty's Government (HMG) of Nepal : 8.6 million

### *Revised Project Funding (under SIRE Program)*

a. Date of Agreement : April 21, 1992  
b. AID Bilateral Funding : \$47.5 million (\$18.8 m Rapti)  
c. Peace Corps : 1.9 million  
d. HMG Nepal : 16.9 million  
e. PACD : April 31, 2002

### *Mode of Implementation:*

- a. Ministry of Local Development (MLD) is the lead HMG agency coordinating the work of GON implementing agencies through Rapti Project Coordinator's Office (PCO) in Tulsipur for all project activities.
- b. USAID/N's Agriculture and Rural Development Office is directly responsible for managing the project within the AID Mission.
- c. The Rapti Development Project (RDP) is implemented in the five districts of the Rapti Zone by the district offices of HMG with the technical support provided by USAID/N's contractors and grantee. Technical assistance are provided by Devres/New Era, No-Frills; CARE/Nepal and National Cooperative Business Association (NCBA).

### *Project Designers:*

USAID/Nepal; HMG, and consultants (PADCO, Devres, No-Frills, CARE/Nepal, NCBA, Sheladia Associates, and Tribhuvan University).

### *Responsible Mission Officials:*

- a. Mission Directors : David M. Wilson, Kelly Kammerer, Philip M. Gary
- b. Project Design Officers : Benjamin A Stoner, USAID/ARD  
: Robert V. Thurston, USAID/ARD  
: James L. Gingerich, USAID/ARD
- c. Project Officers : Charles L. Strickland/Shaubhagya Shrestha  
: Roger A. Bloom/Harsha M. Bajracharya

## **EXECUTIVE SUMMARY**

**SINCE 1970, THE RURAL RESOURCES OF NEPAL** have come under immense pressure. The population has nearly doubled to the current estimated 21 million people. Yet the significant increase in per capita income that reflects sustained growth and helps keep fertility rates low has failed to materialize. It is imperative that the next 30 years not see population pass 42 million, still without the basis for sustained improvement for the rural people of Nepal.

The essential shift to a high-growth strategy is now feasible. It requires a sharp departure from past practices and growth rates. The RDP has effectively demonstrated that sharp break. Particularly since the midterm review, the project has emphasized the commercialization of hill agriculture through high-value cash crops such as fruits and vegetables, promulgated in intensive, geographically defined development pockets, set forth in a sustainable and reproducible context. That strategy has been supported by income generation through community forestry, soil conservation programs, and the development of local self-government through the farmer user group, and other village and district institutions. The project played an important role in forming user groups and helping them focus on a few priorities that they could achieve with limited individual and project resources. In part, they concentrated on improving the operation of private institutions and used public resources to increase the magnitude and effectiveness of those private operations.

Thus, the project is a prototype for sustained development not only in the Rapti Zone, but throughout Nepal. The Rapti prototype is critical to the success of the hill and mountain priority of the Agriculture Perspective Plan (APP). That plan differentiates a hill and mountain strategy based on rapid growth in commercial high-value crops and livestock production. The priorities are vegetables and vegetable seeds, apples, citrus, and dairy products. With the exception of citrus, these have been the successful priorities of the RDP. The APP also gives high priority to forest development, primarily through community forestry. The RDP has pioneered in this effort turning many hectares of forestlands over to community groups. Hill agricultural roads are the critical input priority for hill development in the APP. The RDP has also pioneered in self-help projects designed to build the institutional capacity required for the local development and maintenance of agricultural roads. And, it has provided a model for involving national line agencies in building agricultural roads to major pockets of cash-crop production.

Thus, the RDP has been out front in developing and testing the implementation of the most important priorities in the APP, particularly for the difficult hill regions. The project needs to press on with solving the second-generation problems in these priority

areas. This report draws attention to new problems arising in the Rapti Zone itself as a result of project activities and points to the need to keep the RDP in a dynamic mode. Its recommendations for next phase of the project respond to that need.

The RDP has fostered grass roots *democratization* by organizing democratic user groups oriented to the concerns of their members. It has taken a new part in the development of district and village-level competence designed to raise and manage resources for local needs. There is now an extraordinary opportunity to build on that experience in the context of a massive government expansion of resources for village-level programs. Such expansion could have an immense favorable impact on rural democratization and development. At the same time, steps would have to be taken to guard against wasting those funds and, more important, to prevent mismanagement, which could set back both rural democratization and development. USAID stands before an unusual window of opportunity. The fact that Rapti is seen as the prototype for the current expansion of village development programs throughout Nepal gives USAID a chance to create a much larger impact. This report's evaluation team was continually impressed by the way in which the RDP brought the cutting edge of democratization to the district and local levels of Nepal.

Environmental enhancement is one of the major success stories of the RDP particularly, the handover of forests to user groups and the plan developed for soil conservation and management. So far 10 percent of the forest suitable for community forestry has been turned over in the Rapti Zone, and 42 percent in Salyan district. By contrast, only 2 percent has been handed over nationwide. Now that this critical mass has been achieved in Rapti, the next challenge is to accelerate the rate of turnover by a factor of three or more, so as to have a complete turnover in a period of 20 years. Management and utilization also needs to be improved.

Although the same critical level has not been achieved in soil conservation, a broader and more comprehensive prototype for action has been created. In this case, the emphasis should be on working with the Department of Soil Conservation and Watershed Management (DSCWM) to expand the program to the much larger scale required for national impact. USAID needs to see the work of the DSCWM as responsive and complementary to forest development and therefore should look for ways of continuing support from itself and encouraging appropriate support from other donors.

The RDP has also played an important role in the integration of livestock and fodder production. The management of fodder production is critical to forestry and soil conservation. As incomes rise, the demand for livestock products soars, and is constrained by lack of fodder.

The RDP has brought a dramatic increase in increased income, equity, women's participation, sustainability, and favorable social effects, in all the demonstration pockets. Only modest public resources will be required to expand these pockets since their success has been achieved largely with the farmers' own resources.

At the most modest level, a typical low-elevation farmer, by shifting half the irrigated wheat to intensive vegetable and vegetable seed production, but not reducing rice area at all, experienced nearly a 20 percent increase in income. Some farmers are already shifting all their wheatland to vegetables, with a resulting 50 percent increase in

income. Most farmers are willing to depend on markets for their basic food needs while they radically increase income through specialization and commercialization.

The income of apple farmers is rising two and threefold. Those at the highest elevations have seen their incomes jump well beyond that of those at lower elevations, whose status used to be far higher; small farmers are beginning to see a similar increase in income, now that the larger farmers have taken the risk out of the new opportunities by demonstrating which recommendations succeed.

Women are active members of users groups and are becoming increasingly assertive, especially in vegetable and fruit production. These crops stand to have an immense impact on nutritional status—through the increased availability of low-priced fruits and vegetables as grading improves and the size of kitchen gardens increases to accommodate a wider range of vegetables. Nutrition education for women in the context of the commercialization of fruits and vegetables would be of great social benefit. Given the obvious vitamin A deficiency with the country, that should be an important part of the project.

Hill villages that have felt the greatest impact from cash crops have seen their income from work in India decline by 70 percent over a period of three years, and by 40 percent overall in the impact areas. Meanwhile the cash income from cash crops, livestock, and off-farm work in Nepal has increased by about 40 percent. Adjusting for inflation, the decline in income from India is even more dramatic and the real cash income increase is well over 10 percent. The social impact on families of the dramatic reduction in male migration to India cannot be overstated. Improved housing and increased education (the two priorities for the expenditure of increased household income) have also had an impact as has increased incentive to invest in land and water.

Forestry and other user groups have opened bank accounts with money collected from the sale of forest-based and other products. These funds are being used to improve the village infrastructure and to finance loans at reduced interest rates for modernizing farm operations.

The project has offered something to isolated farmers. Seed production generates cash income in isolated areas (some 5 days' walk from the nearest road), and the livestock programs have introduced improved breeds that are greatly increasing the productivity of animals for home consumption. The latter effort is also setting the stage for a larger production response when incomes rise and markets are opened.

With the success of the intensive priority pocket approach, the project has an unusual opportunity to make inroads on three second-generation problems. First, the line agencies need to be assisted in achieving the administrative changes, level of specialization, and technical competence required to apply the strategy throughout the zone. Second, a means, probably outside the line agencies, needs to be developed for introducing pockets of success, with their strong technical and marketing competence, throughout Nepal. Third, in keeping with reiterated pressure from farmers, the technical production and marketing capacity of Nepal Agriculture Research Council (NARC) to service farmers in high-value crops must be built and carried to other user groups, district by district.

USAID had a large family planning program from the late 1960s to the mid-1980s, then cut it back for a time, and is now rebuilding it once again. The RDP creates a favorable environment for family planning efforts: it is raising incomes, investment in education, and increasing female literacy. Hence there is more interest in having fewer children. Under the project, women are becoming organized and being given a greater role in wide areas of decision making. Also the less disadvantaged areas and groups that typically participate least are taking greater part in both development and family planning efforts. Allocating family planning funds to complement the project activities would reinforce the projects income impact.

Needless to say, the aggregate impact of the project has been reduced by Nepal's population growth and other constraining factors. The APP specifies those limited priorities and the major RDP activities fit directly into them.

## DEMOCRATIZATION

The RDP has spent only about 1 percent of its resources on the self-help program. The payoff has been high. The objective has been to encourage local governments to organize and raise matching resources to carry out local projects wanted by the people, as expressed through democratic processes. The District Development Committee (DDC) has been the major entry point for such efforts. The project has provided important training assistance to the DDCs. As a result of these efforts, the DDCs in the zone, and their chairmen, stand out in their capacity for and contribution to democratic local development.

The RDP developed procedures for evaluating local self-help projects, ensuring broad participation in project selection and implementation, ensuring local resource contribution, and generally improving the selection and administration of self-help projects. The project is well positioned to help develop workable linkages between district and village Development Committees and to integrate organized user groups into the project selection process.

The government recently announced a program expected to provide Rs 300,000 per village for economic development. This program is also immensely important politically: according to the Ministry of Local Development, the massive new program will draw its basic operating procedures from those developed for Rapti. The five districts of Rapti Zone have 229 Village Development Committees (VDC), an average of 46 per district. Thus a massive expansion of self-help programs is intended. The investment will amount to Rs 68.7 million (US\$1.4 million) for the zone, and Rs 1.2 billion (US\$24 million) nationally.

The district-level bodies already have transparent procedures, technical input from line agencies, and experience in working across villages. The VDCs can make an important contribution in project selection and, more important, in implementation. The time is ripe to establish strong relations between DDCs and VDCs. Support in the form of training programs and perhaps the hiring of local private agencies to assist them (as

provided for in the new program) are examples of assistance that would be modest in cost and would make a difference.

More important, when farmer user groups were consulted about the use of the new fund, they were clear that improved roads were their number one priority. The user groups were equally clear that the new self-help funds were not likely to be allocated to roads. There are three reasons for that. First, under the present political process, the resources will tend to go to irrigation, especially for the more influential farmers. Second, roads normally require cooperation among several villages. That would be difficult to achieve without the participation of the DDCs. Third, roads require somewhat more technical input from line agencies attached to DDCs than do the smaller projects undertaken at the VDC level.

The APP places high priority on agricultural roads (feeder roads to the main district level roads). It uses the term "agricultural roads" to indicate the emphasis will be on areas that have a high potential for the intensification of agriculture—but of course it recognizes that the impact of roads goes far beyond agriculture. The APP program budget earmarks Rs 90 crore per year (US\$18 million) over 20 years to provide a full grid of all-weather roads. The government's new village grant program allocates Rs 120 crore per year (US\$24 million). Thus it provides sufficient annual financial resources to cover the agricultural road program, with one-third left over for other purposes—including such high-priority items as village drinking water and buildings for important village functions, which village-level authorities also rank as high priorities.

The RDP, has played a major role in the construction and maintenance of roads to three of the five district headquarters: Salyan, Rolpa, and Pyuthan. The roads to district headquarters are not only passable by car but also open up the area for feeder roads or trails that tap a much larger area. The project has recently transferred its road focus to initiating a feeder road to a major apple-and vegetable-producing area. This move encompasses four important decisions. First, while the initial 10 kilometers will be motorable, the remainder will be built to mule-track standards, but with gradients suitable for motor vehicles. Second, the Department of Roads has been brought into building agricultural feeder roads, an activity that has received almost no attention in the past. Third, local people are expected to provide the resources for upgrading the road to motorable status. Fourth, the road is specifically oriented toward high-productivity agricultural areas.

For all the above reasons, it would be desirable for the USAID to continue providing technical assistance to the vital democratization process at the district and village level. Rural people have demonstrated their understanding of voting, the functions of government, and basic organization. They need help in solving more complex problems. A reoriented Vegetable, Fruit, and Cash Crops (VFC) program will accelerate the organization of user groups, an important component of rural democratization. But direct assistance to the formal governmental institutions, including DDCs and VDCs is also needed.

## ENVIRONMENT

The most striking environmental impact of the RDP is its development of forestry user groups with the aid of the Department of Forest (DOF) and Department of Soil Conservation Office (DSC) and the handing over of forestland to those user groups. As already mentioned, more than 10 percent of the forest now judged appropriate for community operation has been handed over in Rapti.

It has taken eight years, at 3,000 hectares per year to reach this level. To complete the task in a 20-year period, the effort will have to be quadrupled to 12,000 hectares per year. This raises two questions. First, what changes, if any, in administrative and implementing structures will be required to accelerate the process in the Rapti Zone to the level required to complete the handover within that period? Second, how can Rapti success be emulated in other zones?

Forest user groups universally do an excellent job of protecting the forests they take over. They do so by hiring watchmen and regulating the quantities of grass and tree products that can be removed. However, rather little has been done to build management skills. Some skills require strong technical input from foresters, and some may even require additional research under Nepal's conditions. The project has yet to determine who will fill these functions and under what conditions. It should do so in the next phase.

Once the currently planned forestry legislation is passed, difficult issues will arise with respect to harvesting, processing, and marketing trees and tree products. These include questions about rates and purposes of cutting and investment in manufacturing (e.g., in sawmills). Now that the handover is well under way, these issues need to be joined, and again the project should be at the forefront of the movements.

Another important issue that must be addressed is to delineate what land should remain in national forest and what should be given to community groups. National forests are still viewed as a "free" resource to harvest forest products that are not obtainable from controlled community forests. Although establishing national forests as preserves will be a necessarily contentious and important issue, it will also serve a salutary process in delineating DOF responsibilities in the direct management of forest.

Although the RDP project developed an effective program, it has only been implemented on a very modest scale. The core of the program is devoted to arresting gully erosion and creating economic output. It does so through a program of planting appropriate grasses, legumes, and trees. Currently, the value of seed harvested for similar seeding elsewhere provides high returns; the value of the fodder, and eventually tree products, appear to make the efforts sustainable even without seed sales. The results have been dramatic.

The DSC has therefore adopted the technical model, as well as the approach to community organization essential to its application, for elsewhere. However, the project is now working on only three sites per district. Thus, the critical issue is how this estimable program can be raised beyond the project scale to a nationally significant level. Given the effectiveness of the model and its complete acceptance by the DSC, the need is solely for large-scale training and financing. The commitment and dedication of the DSC in the face of small resources needs to be rewarded by sustaining those efforts. It

is vital for USAID to recognize that soil conservation work has an important forestry element, and therefore needs to be part of further forestry work, and furthermore that knowledge acquired during the Rapti project could be used to encourage appropriate.

The work in forestry and soil conservation is explicitly environmentally oriented. Both have favorable investment returns and income potentials. Conversely, the explicitly income-oriented projects have important favorable environmental effects. Fruit trees are stabilizing steep slopes. Particularly in the apple-growing areas, farmers consistently report reduced livestock numbers. More area to apples requires less plowing, and higher incomes reduce the necessity of scavenging for fodder from distant forests at low returns to women's labor. These are desirable environmental effects. However, the need for increased livestock production must now be met by research and extension to increase fodder production under high-yielding conditions. The soil conservation and forestry work has assisted by providing intense fodder production on formerly eroded lands. Integration of forestry, soil conservation, and animal husbandry needs continuing attention.

### **INCOME GENERATION AND EQUITY**

Since the midterm evaluation, the RDP has been oriented to raising incomes, particularly cash incomes. It has done so in response to clearly expressed priorities of rural people. They recognize market-oriented possibilities for raising cash incomes as a means to meet pressing social needs.

Several factors account for the success of this aspect of the project: (1) priority was given to a few commodities with the potential for a large increase in the income of individual farmers and in the aggregate; (2) initially, the emphasis was on a few pockets in which success could be ensured and an aggregate impact on the pocket achieved; (3) farmer user groups were organized so as to encompass both production and marketing and thereby reach farmers with services and bargaining power in an efficient manner; (4) private traders were used for input supply and marketing, but market power was kept in the hands of farmers. That partnership between farmers and private traders needs to be broadened to allow line agencies at the district level to play a larger role in facilitating those arrangements and helping to make them work.

A high-level, Non-Government Organizations (NGO), advisory input has provided access to technical advice both in Nepal and India, and workshops have been used to facilitate the contact between user groups and traders. In addition, farmers are used at low cost to spread technical messages. The Department of Agricultural Development (DOAD) plays an important ancillary role in spreading the message, while the seed production station at Mushicote and the NARC station at Lumle are important Nepali sources of information. It is now time to both deepen and widen these efforts. In particular, the high-level input on market development and the private sector role must be elaborated and spread.

Pilot projects are often impossible to reproduce because the intensity of the effort can only be sustained in an area so small that it cannot have an aggregate impact. In

principle, that has not been the case of the RDP pocket approach. It is broadly reproducible. However, the number and size of the pockets is such that it has not yet been possible to achieve an aggregate impact on Nepal more generally, or the Rapti Zone more narrowly. Obtaining an aggregate impact should be a project objective, and suggestions for achieving that are made below.

The importance of user groups is best illustrated by the marketing association in Jinabang, which has not only served as an efficient conduit for production technology information but has also pioneered in markets in Butwal and Kathmandu. Leaders of the user groups have themselves traveled to those points to ascertain market requirements. Since two-thirds of the apple trees now planted have yet to reach bearing age, it is none too soon to think about developing more distant markets. The user groups are already exploring Indian markets, recognize the large potential, and are beginning to think about what needs to be done to move into those markets. The project orientation toward user NGOs and private sector activities is important in keeping project costs low enough to make the effort not only efficient but reproducible. As the World Bank develops its assistance to the national agricultural extension system, it needs to note the immense increase in the efficiency of the flow of information when user groups participate in the process. The World Bank should therefore allow for the training and other costs needed to speed the development of these groups.

From the preceding analysis as well as expressed farmer needs, it seems clear that the process responsible for the rapid spread of the pocket successes to the rest of the Rapti Zone has to be institutionalized. Second, the process has to be spread throughout Nepal for an aggregate national impact. Third, the technological level of agricultural and forestry production and marketing must expand. The latter was strongly emphasized by the best-organized farmer user groups and reinforced by the field visits.

Once successful pockets of highly commercialized agriculture and other resource development have been established in a district, they need to be spread expeditiously to the rest of the district. The next phase of the project should help the DOAD, and other resource development agencies take steps to (1) diagnose the staff specialization essential to the effective spread of the pocket successes (e.g., apple, specific vegetable seed, citrus specialists rather than horticultural generalists); (2) select and train staff for the specialized input; (3) train appropriate staff in organizing the user groups that are essential to the efficient spread of the appropriate production and marketing technologies and to developing market power on the part of farmers; (4) develop a close liaison between the initial pockets and the DOAD efforts to spread the appropriate technology; (5) select areas that would be suitable for spread of pocket activities (geographic prioritization must continue even in the "spread" phase); and (6) experiment with using local NGOs on contract to achieve specified purposes. In the case of NGOs the project provides several valuable experiments and guidelines.

One of the complex demands of the project has been to diagnose, within broad national priorities, the suitable production and marketing technologies for developing successful pockets of intense commercial activity; set up the initial organization of user groups in those pockets; find appropriate technologies and marketing approaches; and develop effective interactions between private user groups and private marketing

agencies. This complex task requires a strong diagnostic capability. So far, the project has developed that capability significantly apart from the various line agencies. For some time to come that will continue to be the correct approach. The use of a high-level NGO has provided the flexibility in staffing and other administrative elements that allow a few persons with unusual intuitive insights and practical background to come up with feasible pocket approaches. The project should attempt to develop an integrated NGO-operated system for application of that highly imaginative approach on an all-Nepal basis. At the least, the project should experiment with spreading that impact more quickly within Rapti, and with links with DOAD. The high-level NGO effort should be seen as complementary to DOAD and certainly not as competitive. In the long run, this effort can be supplanted by a combination of NARC, the larger and more vigorous user groups, and the larger, and more vigorous private traders.

Once successful pockets have been in place for a few years, farmers find themselves facing a host of production and marketing questions that the project staff and Nepal's institutions in general are now incapable of answering. Yet it is essential for the project itself to address these issues. Many questions on the production side have to do with soil and atmospheric conditions: Why do apple trees generally suffer from moisture stress at fruit setting time, and could better soil and moisture management alleviate this problem? How is soil fertility determined? What is the difference between inorganic and organic fertilizers? What use can be made of legume fodder crops? What is the significance of trace elements in the soil? What pruning and spraying practices need to be improved? What silvicultural practices need to be observed in wood processing? Some of these questions will depend on scientific research for an answer.

On the marketing side, the most obvious problems have to do with selecting the varieties and grades best suited for various market niches, determining the products shipping quality, packing for various modes of transport, choosing the transport vehicle, and pleasing the tastes in key present and future markets. Essential scale economies and the realities of quality control argue for a market strategy that commences with import displacement (but only in commodities with a clear comparative advantage, including scale economies), and then tackling the immense Indian market, and finally attempting to enter the high-income export markets. However, it is not too early to begin to develop an understanding of what is involved in training for those markets, how to begin preparing for it, and what institutional developments will be needed. A next phase of Rapti should provide the technical assistance to begin addressing those problems.

Research assistance may also be needed to determine how to respond to the rapid increase in demand for livestock products in the pockets, how to produce the high-quality fodder to meet that demand, and what to do about the decline in the use of some traditional sources of fodder as incomes rise. Such research must approach farms as integrated systems, and must therefore take into account aspects of livestock or cash crop production, soil conservation, and forest development.

Research issues cannot be tackled, however, until NARC has the know-how to deal with vegetable, vegetable seed, citrus, apple, and fodder problems (stated APP priorities), can direct the research to on-farm experimentation (as outlined in the recent priority-setting exercise for NARC), and can conduct on-farm research in all major zones

(the Rapti Zone in particular needs such research and is not readily accessible from existing stations). The success of the large-plot demonstrations in the project augur well for large-scale on-farm research by NARC. NARC and other institutions also need to be able to handle marketing questions, including those pertaining to distant high-income markets. As NARC develops its priorities for this work, it must identify the areas in which the private sector may be able to perform well in transferring technology and therefore concentrate its own efforts in the areas that go completely uncovered.

The Institute of Forestry's research capability and the utilization of data at the Ministry of Forest and Soil Conservation Research Department also need strengthening in order to make extension efforts more effective. Both agriculture and forestry research need to take a serious look at marketing and manufacturing of wood products.

The project has had a successful livestock development component, which has emphasized introducing improved breeds of several animals. These measures have been highly profitable and well received. At present, however livestock production and marketing are hampered by the slow pace of income growth in Nepal. Hence the livestock effort has been held back. When income growth accelerates, the benefits from the livestock program will show up more clearly. In the meantime, it is having a beneficial effect on the real incomes of low-income, subsistence farmers. The great success of the livestock user groups (more than in any other activity) attests to the soundness of the program.

The largest potential for an aggregate impact from RDP activities lies in the hills, which will be even greater when road access improves. From the beginning, the project has put considerable emphasis on Dang district. It accounts for roughly half the population of the Rapti Zone, a high proportion of which is concentrated in the two large inner terai valleys of the district. Although the project has had pocket successes in Dang, there are barriers to aggregate impact there, and they need to be removed.

With its flat topography and alluvial soils, the Dang Valley is typical of the inner terai. Because only small proportion of the land is irrigated and much of that depends on river diversions that provide water mainly when it rains, the region is not altogether hospitable to agricultural production. Also the road infrastructure is even poorer than average for a terai district, and land tenure conditions are much worse in Dang than in other parts of the terai. Not surprisingly, growth rates in cereals and major cash-crop production for Dang district have been somewhat below the average for the terai.

Development of the Dang Valley will call for a massive investment in roads, shallow tubewells where feasible and deep tubewells elsewhere. At present, the forestry and soil conservation works are concentrating on establishing a protective cover and reclaiming gullied land on the rim slopes of the valley hills. These measures are improving the hydrologic regime. Such support to water production and aquifer recharge must accelerate in the context of large-scale groundwater development. When those investments are made other investments will have a high pay-off.

If the project is to continue to work in the Dang Valley, it should try to form user groups for shallow tubewells; promote the clustering of shallow tubewells, to facilitate cattle control and hence increased multiple cropping; develop high-intensity farming systems for shallow tubewells; and analyze the relation of the land tenure system to

intensive farming systems, with consequent policy recommendations. This is the foremost priority of the APP for the terai.

## **PARTICIPANT TRAINING**

Participant training has been one of RDP's most effective means of developing local institutional capacity and promoting coordination and interinstitutional collaborative efforts. Because of direct training, workshops, and the practical involvement of the people, members of the user groups, local government bodies, and line agency staff found it easier to accept the identification and planning process.

Training such as Technical and Rural Communication (TARC) and Forestry and Communication Training (FACT) for the field-level extension workers, Women Development Office/Officer (WDO), and District Forest Officer (DFO) has enhanced their capacity to deal effectively and democratically with user groups. The Community Resource Management System (CRMS) approach has enabled user groups to manage their farm and forest resources. The planning and budget review meetings have been particularly helpful in increasing the knowledge of the elected representatives of the local political bodies and have facilitated the development of a consensus among these bodies and the line agencies.

The government official received training can still be of use in other parts of the country when they are transferred. Such officials appear to be contributing, in varying degrees to the diffusion of RDP perspectives and methods in the bureaucracy. Because of the involvement, the elected representatives of the DDC/VDC have been able to exercise their acquired knowledge and skills in their respective districts and the subdistrict areas beyond the confines of the RDP targeted pocket areas. Within the RDP targeted areas, the effort to build the capacity of the user groups has not only contributed to their efficiency but has also set in motion the process of democratization, through which they have been able to mobilize themselves and obtain services from the line agencies to fulfill their own needs and thus further their own interests.

At the same time, there is some scope for further refinement, consolidation, and expansion of these training efforts. In particular, regular budgetary allocation for training of the type facilitated by RDP, and fuller utilization by the government of the line agency staff who have received trainers' training can help to institutionalize the training activities. The PCO is trying to keep the trained government staff in the project areas for at least a year. The responsibility and accountability for any breach in such provisions made to retain the trained staff have not always been clear, and loopholes are said to exist.

With more participants being trained, there is a greater chance for arriving at a consensus and shared perspective within the targeted institutions. For the most part, RDP reviews and workshops have involved the chairman and deputy chairman of the DDC/VDC. If the leaders of the main opposition parties were also involved, training would provide more continuity. At the village level, field training has been successful

in involving more VDC worker participants, and such field training should be continued and increased. Farmer-to-farmer training has not been widely practiced in RDP areas.

Women's participation in training should also be increased, especially for women's user groups. Even though as much as 60 percent of the loans for rearing small animals has been disbursed through WID programs, the women receiving training in livestock is no more than 7 percent. Women's groups have been purposive and able to integrate the sectoral activities, and thus should receive more priority in training and production programs.

Despite the RDP's concentration on improving knowledge, know-how, and skills on promoting the participatory approach in planning and implementation, this effort has not been sufficient to meet emerging training needs. Among the FUGs, for example, the technology of plantation management and skills in harvesting the forest produce seem to be in demand rather than skills in establishing and preserving of community forests. Nevertheless, if they are to make effective use of their resources, user groups need to be adept in organizational management, long-and short-term planning, and technical and financial management. In short, the training inputs should now be directed more forcefully toward building the capacity of the participants and their institutions in these areas.

In the pre-withdrawal phase, the RDP should also investigate how to handover its training and coordinating functions to permanent local institutions to ensure sustainability.

## WOMEN

The impact of the project on women can be traced to four factors: the direct increase in family incomes; greater availability of nutritionally important fruits and vegetables; the organization of women's user groups; and literacy programs for women. The change in women's status is necessarily an evolutionary process. The four entry points of the project complement each other and speed the process.

The world over, the educational achievement of children appears to be closely related to the education of the mother. Repeated interviewing has corroborated that the primary objective of women in literacy programs is to be able to help their children in school, and, indeed, to ensure that they obtain schooling. The women interviewed firmly believed that their personal participation in literacy programs had a strong motivational effect on the children. Further, in traditional societies it is common for literate women to play a major role in overall family financial management, giving them a source of influence in an increasingly outward-looking world. Women also cited the importance of being able to read instructions on pesticides and mentioned many other direct uses of literacy skills. Teaching materials, particularly at the more advanced levels, are used to teach health, nutrition, and sanitation lessons.

Local NGOs offer an opportunity for a large low-cost impact on women's literacy, health, and family planning. The project should consider expanding of these activities in the favorable context of its income-raising efforts.

## **POPULATION**

The project has not had a direct input or effect on family planning. It is creating a favorable environment of rising incomes, consequently an increased expenditure on education (consistently cited as the most important target for increased incomes), and a concern for a few well-raised children. The literacy programs have increased women's awareness and capacity to manage family affairs in a rapidly changing environment which they might otherwise be left out. Women's user organizations increase the control of women over a wide range of activities and allow them to experiment and feel their way toward greater control of family and other affairs. In that favorable context, USAID's family planning efforts would have a greater impact than if isolated from such activities.

## **NUTRITION IMPACT**

Increased incomes have an immensely favorable impact on nutrition, given the high propensity to spend that income on fruits, vegetables and livestock products. The size of kitchen gardens has grown enormously and there is greater variety in the pockets of intense cash-crop activity. People are now more aware of a wider variety of vegetables. At the same time, children still seem to suffer from protein deficiency but the high and rising effective cost of fodder is reducing the supply of livestock products. The project would do well to focus on that problem. Vitamin A deficiency also seems substantial. The project is having a major impact on the consumption of leafy greens and has created a favorable environment for introducing products rich in vitamin A such as carrots for home consumption. In this favorable context, it would be desirable to orient women's programs toward specific nutritional concerns.

## **MONITORING, EVALUATION, AND POLICY IMPACT**

A major contribution of the RDP should be to demonstrate how data generated in the project can be used to correct project activities and influence macro policy at the national level. The project has generated useful information of this nature, and the monitoring adviser worked hard to develop the immensely useful data derived briefs. However, the benchmark survey, the 10 years follow-up, and monitoring more generally have not been formulated to answer key questions about the project or to assist in policy formulation.

Projects should be a key source of information for the evolution of national policy. To play that role, the relevant data must be generated in the context of a clearly stated analytical framework derived from an understanding of the key policy issues. Project analysis of fertilizer policy, for example, at the operational level and analysis of the VFC program have been useful and important, but the effort could have been more substantial with only a small increase in cost. A high-quality expatriate input could be

particularly effective in this area. In the future, explicit attention should be given to these data-based issues and to providing an effective mix of national and expatriate input.

## **CONCLUSIONS—FUTURE PROGRAM PRIORITIES**

The two RDP programs with critical mass are community forestry and high-value cash crops. They are both ready for a major evolutionary step.

### **Community Forestry**

The project has effectively demonstrated how forests can be put into the hands of the people who will manage and conserve them, and its strategy here has had an aggregate impact in the zone. The project should continue to pressure and assist the Forestry and Soil Conservation Departments in spreading the impact at a constantly accelerating pace. But, the project now needs to move out front in three areas, with consequent changes in organization and expenditure patterns. Each of these would be most efficiently pursued by remaining in the present five Rapti Zone districts.

First, the success in organizing of users groups has created a need for assistance to those groups: they need information on proper management, utilization, manufacturing, and the marketing of wood and wood products. This information is essential to the long-term effective use of the forests. Moreover, user groups recognize that they need such assistance. That assistance will have a larger technical component than in the past, and therefore it is essential to determine what agencies will give what assistance in what manner to forest users groups. The appropriate line agencies will find it helpful to develop their technical capacity as well as appropriate relations with the private sector, as was done in the cash-crops program.

Second, what constitutes forest land suitable for community forestry has not yet been clearly defined. Who can therefore say which national forests should remain under Department of Forestry Management? That question is becoming increasingly important as more and more land moves into the hands of community forestry user groups. It has implications for the establishment and sharing of income obtained from these forests— income that supports management, administration, and research. Technical assistance is needed not only in drawing the lines around the different types of uses, but also in developing the capacity of the Department of Forestry to manage the forests inevitably left in its control.

Third, the project needs to draw on its success and thereby persuade HMG of the importance of proceeding vigorously the currently planned forest legislation.

### **High-Value Cash Crops (The VFC Program)**

The project's high-value crops have had a remarkable impact on farmer's total and cash incomes in a substantial number of geographic pockets. These crops will be the most important means of putting the hill and mountain districts of Nepal on the map of rapid growth. The project needs to move on three fronts to leave a lasting, aggregate impact on Nepal.

First, the impact needs to spread sufficiently beyond the current pockets so as to ensure continuous, rapid growth in aggregate incomes in the zone. This cannot take place without major changes in the operations of DOAD, changes that are already under way to a small degree in the project.

Second, the project needs to find the institutional means to spread the approach throughout Nepal. Because of their structure, Nepal's line agencies would probably not be up to the task. Hence, it may be necessary to mobilize high-quality private sector NGO diagnostic skills in order to find production and marketing niches for each zone. As a result of this effort, the project could well expand beyond the present five districts.

Third, the base of technical production and marketing knowledge for high-value cash crops must be expanded, but some attention must first be given to the order of priority of the necessary actions. Farmers are already clear about their felt needs in this area and their inability to solve these problems on their own. USAID's continuing assistance to the national agricultural research system could be related to the VFC program; in addition, an effort could be made to strengthen NARC's capacity for on-farm research in vegetables, apples, and citrus—hill commodities given high priority in the APP. Marketing capacity also needs to be strengthened; production and marketing need to interact more closely in order to put production systems in closer touch with markets; and storage and marketing channels need to be improved. In the long term, Nepal needs to develop the capacity and sophistication to reach markets beyond India.

**DEMOCRATIZATION.** Perhaps the project's most outstanding achievement has been to help governments develop into institutions capable of meeting community needs. HMG is now committed to massive expenditure in this area. It needs help in this endeavor. The Rapti Zone could continue its role as a pioneer in this most vital element of democratization. As stated clearly at the highest level in the Ministry of Local Development, Nepal's citizens have demonstrated their capacity to understand civic participation, and to participate as can be done best—namely, in elections. The kind of assistance needed now is to build up the relations among various local government bodies (DDCs, VDCs, line agencies) and various user groups. These are complex problems that will sorely challenge USAID in the next phase of its assistance. There is no more important means of advancing democratization at its cutting edge. Rarely does a donor find the government so far out front in financing such an activity, but greatly in need of technical assistance.

**POLICY IMPACT.** The project has not yet realized its full impact, or the potential dimensions of that impact, owing to the lack of attention to data collection in an appropriate analytical framework. Any extension of project activities needs to call for a higher level of analytical effort, with its accompanying increased data requirements.

**WOMEN.** Women have already benefitted greatly from the project and its income-raising features. That effect will be reinforced in the modifications recommended above. In addition, special attention should be given to women's literacy programs in the context of other project changes. Such programs would have profound implications for the next generation, when education will be essential to family progress as well as to family planning. Furthermore, women need help, presumably from the women in development offices, in improving their performance in traditional women's activities—such as effective kitchen gardens, nutrition education, child health and feeding, and family planning. These activities should all be strengthened and integrated into women's income-earning potential.

Thus, the next phase of the RDP has an extraordinary opportunity to build on its past success: to bring about a major environmental improvement, launch democratization at the frontier's of action, set the path for a quantum leap in hill-farmer incomes, and not only incorporate women into development but enrich their lives by strengthening the health and well-being of the families for which they are principally responsible. We hope this evaluation will be helpful in steering the project in new and exciting directions.

## **ACKNOWLEDGMENTS**

**This report could not have been written without the help of many. The staff of IIDS, USAID, the Project Coordinators Office at Tulsipur, the Technical Assistance Team of RDP, the Village Development Committees, the District Development Committees, and all the many villagers and line agency staffs were most helpful. They are listed in Appendix.**

**Within that overall context of gratitude for so much help, we would like to especially thank Allen Turner for his unstinting help and access to project information, Roger Bloom, James Gingerich and Harsha Bajracharya for the many courtesies throughout the effort, Michael Rechlin and his forestry team for the useful interactions as our mission's paths crossed, and most of all to the many farmers who spent so much time with us in the field. We remain touched by their worries, their concerns, and their hopes. It is our wish that in some small way our mission will help in creating the environment they need to achieve what they want all for which they are working so hard. Finally, thanks to the hard-working staff of IIDS and JMA, Inc., who worked unstintingly against tight deadlines with no thought to normal working hours.**

## ACRONYMS

<b>ADBN</b>	<b>Agriculture Development Bank, Nepal</b>
<b>APP</b>	<b>Agriculture Perspective Plan</b>
<b>APROSC</b>	<b>Agricultural Projects Services Center</b>
<b>ATU/PEU</b>	<b>Appropriate Technology Unit/Private Enterprise Unit</b>
<b>CRMS</b>	<b>Community Resource Management System</b>
<b>CUG</b>	<b>Conservation Users Group</b>
<b>DADO</b>	<b>District Agriculture Development Office/Officer</b>
<b>DDC</b>	<b>District Development Committee</b>
<b>DFO</b>	<b>District Forest Officer/Office</b>
<b>DOAD</b>	<b>Department of Agriculture Development</b>
<b>DOF</b>	<b>Department of Forest</b>
<b>DOR</b>	<b>Department of Roads</b>
<b>DSCO</b>	<b>District Soil Conservation Office</b>
<b>DSCWM</b>	<b>Department of Soil Conservation and Watershed Management</b>
<b>FACT</b>	<b>Forestry and Communication Training</b>
<b>FUG</b>	<b>Forest User Group</b>
<b>GON</b>	<b>Government of Nepal</b>
<b>HMG</b>	<b>His Majesty's Government of Nepal</b>
<b>JT</b>	<b>Junior Technician</b>
<b>JTA</b>	<b>Junior Technical Assistant</b>
<b>LDO</b>	<b>Local Development Officer/Office</b>
<b>MLD</b>	<b>Ministry of Local Development</b>
<b>NARC</b>	<b>Nepal Agriculture Research Council</b>
<b>NCBA</b>	<b>National Cooperative Business Association</b>
<b>NGO</b>	<b>Non-Government Organizations</b>
<b>PCO</b>	<b>Project Coordinator's Office</b>
<b>PIL</b>	<b>Project Implementation Letter</b>
<b>RDA</b>	<b>Regional Director of Agriculture</b>
<b>RDP</b>	<b>Rapti Development Project</b>
<b>SFDP</b>	<b>Small Farmer Development Program</b>
<b>TA</b>	<b>Technical Assistance</b>
<b>TARC</b>	<b>Technical and Rural Communication</b>
<b>VDC</b>	<b>Village Development Committee</b>
<b>VFC</b>	<b>Vegetable, Fruit, and Cash Crops</b>
<b>WDD</b>	<b>Women Development Division</b>
<b>WDO</b>	<b>Women Development Office/Officer</b>

# 1

## INTRODUCTION

This report presents a final evaluation of the Rapti Development Project (RDP, 367-0155). Its purpose is threefold:

1. To assess the project's present, midterm, and long-term results in terms of its contribution to the stated goal, its specific output achievements, and the effectiveness of its inputs.
2. To analyze and describe the specific factors leading to these results in the areas of design, strategy, and implementation.
3. To provide His Majesty's Government of Nepal (HMG) and USAID with recommendations for following up on or phasing out the project and for formulating future development strategies and/or programs.

### RAPTI ZONE

The Rapti Zone covers 1.5 million hectares and includes 5 of Nepal's 75 districts<sup>1</sup>. It is one of three areas of development in the midwestern region. More than a million people live on its diverse landscapes, which range in altitude from 200 meters along the Nepal-Indian border to 7,000 meters in the high Himalaya region. This landscape can be divided into five physiographic regions: the Siwaliks, Dun Valley, Middle Mountains, High Mountains, and High Himalayans (Annex 6).

---

1. For a detailed description of the Rapti area see *Integrated Technical and Economic Appraisal for the Rapti Development Project* (1991).

## **Siwaliks**

The southern part of the zone is crossed by a range of highly eroded hills known as the Siwaliks. This region makes up approximately 24 percent of the zone. The hills have a relief of up to 300 meters and their geologic complex consists of interbedded conglomerates, sandstone, siltstone, mudstone, and recent sediments in varying degrees of consolidation and bedding. Water is a limiting factor. The hills are covered primarily with forest-grass vegetation protected by the DOF.

## **Dun Valleys**

The next region consists of two prominent valleys, Dang and Deukhuri (together known as the Dun Valleys), lying between the Siwalik Hills and the southernmost hill range of the Middle Mountains. These valleys produce over half of the agricultural output in the zone and are inhabited by about 40 percent of the zone's population. The valleys are accessible year-round by a gravel road network connected to the East-West Highway and three other districts.

## **Middle Mountains**

About 45 percent of the Rapti Zone consists of a belt of mountains ranging from 1,000 meters to 1—3 kilometers in altitude. The bedrock here is predominantly phyllites interbedded with quartzite and pockets of limestone, which in some areas are highly fractured.

Because the slopes are more gentle than in the Siwaliks, the region can support terrace agriculture. It is possible to grow two crops per year with the aid of traditional mountain slope irrigation. Rice is produced in the wider valley bottoms of the Jhimruk and Madi rivers and some of their tributaries. Although the region has been increasing its agricultural base, it continues to import most of its food.

About 43 percent of the Rapti population is concentrated in this region. It has been made more accessible in the past five years by roads to Salyan, Libang, and Phyuthan. A large hydroelectric plant at Devasthan, constructed with Norwegian aid, supplies electricity to the entire zone.

## **High Mountains**

About 24 percent of the Rapti Zone consists of mountains rising to 2,000 meters. The bedrock here is dominated by less fractured phyllites, micaschist, and other metamorphosed sedimentary rocks. The slopes are steeper than in the lower Middle Mountains and the valley bottoms are narrower.

Only about 16 percent of the Rapti population inhabits this region, but the cultivated area appears to be about the same as in the Middle Mountains. Agricultural production is below subsistence level, supplying six months or less food. Despite the region's many springs, streams, and rivers, crop production remains dependent on traditional mountain irrigation, which can only serve command areas of 2-10 hectares. There are no roads into the area.

### **High Himalayas**

The remaining 7 percent of the zone is covered by a range of mountains reaching up to 7,000 meters. The meadows below the permanent snowline are used for summer grazing. Natural forest covers most of the area below the timberline, at about 4,300 meters. The population density is less than 1 percent and is concentrated along north-south trek routes.

### **Soils**

The soils in this hill-mountain zone vary greatly in depth, available nutrients, texture, and water-holding capacity. Some clay-textured soils are found in the Dun Valleys, but the predominant types are loams and sandy loams. Because of years of use, the Rapti's soil must be enhanced with fertilizer. The most common fertilizer used is a compost of forest litter and animal dung. Increasing quantities of inorganic fertilizer are also being used, even in remote areas.

### **Natural Vegetation**

The natural vegetation in the Rapti Zone ranges from tropical Sal forest at the lower elevations to subalpine conifer forest in the High Himalayas. This vegetation has been greatly altered by human activity. High-risk slopes are devoid of covering vegetation, or at best have scattered grasses and shrubs. The Rapti Project is making a significant contribution to the recovery of natural vegetation.

### **The People**

The Rapti social structure is a modified version of the traditional Hindu caste system. The dominant castes are the Brahmins and Chhetris. In addition, the zone has some Newaris, living mostly in the bazaar towns, and Magars and Kham Magars, which are the main groups in the hills. There is also a significant Tharu population in the Dun Valleys. The social structure and its influence are discussed in greater detail in other sections of this report.

## **PROJECT OBJECTIVES**

The RDP was launched in 1987 as Phase II of an intense development effort begun in 1980 and expected to last 15 to 20 years. Its primary objective is to improve life in the Rapti Zone by strengthening village and district economic capabilities and expanding the zone's resources, infrastructure, and social services.

In 1991 the RDP directed its attention to "increasing household income and well-being through increased productivity and improved sustainable management of farm and forest resource systems." Recent activities have therefore concentrated on increasing farm/forest productivity, strengthening local groups and private enterprises, and developing district institutions.

This redirection is in keeping with the conclusion reached in the original project paper (May 1980), that "the project soundness will depend greatly on the ability of project managers to identify and incorporate necessary readjustments as informed through adept monitoring."

## **STRATEGY AND APPROACH**

RDP's strategy for enhancing farm and forest productivity has been to support the gradual development of local capacity and responsibility for managing natural resources. Thus the focus has been on improving productivity and profitability among resource user groups, private individuals and entities, and public extension institutions. To this end, the RDP has promoted the spread and acceptance of appropriate technology successfully demonstrated during Phase I (367-0129) and has capitalized on results from elsewhere in Nepal and Asia.

To strengthen institutions in the zone and build up the capacity of government line agencies, the RDP has provided budget and training support, technical assistance, and help with commodity procurement. Equally important, it has taken measures to strengthen private and local community initiatives in managing resources having high-value potential. At the heart of these interlinked activities has been an effort to accelerate farmer training and organize and support local groups.

## **IMPLEMENTATION HISTORY**

The multisectoral project of which RDP is a part was designed to address a question raised in 1977: namely, whether agricultural production in the hills of Nepal could be increased appreciably through the mobilization of local resources. This effort was to include the training and the participation of women.

The government's approach to programming a donor-support project in the 1970s was to allocate it to administrative zones. That is how the Rapti Zone came to be targeted for USAID assistance. As already mentioned, the project area includes five districts

(Dang, Salyan, Rolpa, Phyuhan and Rukum). These are among the country's poorest and most remote regions.

The project designed in 1979-80 (367-0129) fully recognized the complexity of bringing economic and social change to rural areas, particularly in a mountain environment with virtually no access to outside market opportunities. Therefore, USAID implemented an integrated rural development project in fiscal 1981 to help the government meet the basic needs of Nepal's poor majority, especially those in the middle hills.

The Rapti Zone development project (367-0129) had two specific objectives: to increase the measurable aspects of the quality of life, including income and production levels, of families in the Rapti Zone; and to improve local demand for, and control of national delivery systems for improved agriculture, health, education, resource management, and family planning.

Six input/output activities were funded: farming systems, renewable resource management, employment and skills development (which included rural industry), education and appropriate technology/alternate energy, rural works which incorporated rural roads and small self-help rural works, and institutional development (which was to be supported by district and local development, the establishment of a project coordination office, and other donor activities).

The Final Evaluation of Project 367-0129, issued on October 31, 1985, concluded that the project "components remained separated, rather than strongly linked and focused." Since the management structure was also fragmented, only 54 percent of the planned targets were met.

Despite these failings, project management successfully laid the foundation for Phase II. Significant progress was made in establishing support for agricultural growth and improving the forestry resource and soil and water conservation base. In addition, the project helped strengthen the capacity of districts and villages to plan and manage their resources. Private enterprise began taking steps to increase individual incomes.

In keeping with the concept of promoting development gradually over a period of 15 to 20 years by helping management and people improve their capacity to absorb technology, the 1985 final evaluation of Phase I recommended that a Phase II project be launched with the following objectives:

1. Continue support for strengthening institutional capacity for managing development at district and village levels.
2. Expand and strengthen the program for managing the natural resources.
3. Concentrate resources on agricultural production in both valley and hill areas.

These measures were to be adopted without disrupting other activities in progress and were to reinforce support from the USAID mission and other projects. As noted earlier, Phase II was implemented in July 1987 as the Rapti Development Project (367-0155). It was formulated following an integrated technical and economic appraisal, by

Devres/New Era in January 1991, that was based on a midterm evaluation of Phase I. According to this appraisal, the farming systems in Rapti Zone are extremely diverse; each system is characterized by intricate and complex interactions among cropland, forests, grazing, and livestock; farmers in the project area are extremely efficient and are rational managers, and priority is given to subsistence production. Most important, the country's population growth is dwarfing all project interventions.

These findings led to the following recommendations:

- Increase family planning efforts
- Increase focus on women
- Give priority to market-led and producer driven activities
- Give emphasize to group activities and individual producer initiatives.
- On-farm activities should be based on rigorous technical and financial appraisal.
- There should be closer supervision of development activities.

In support of these recommendations, it was argued that immediate attention should be given to the following measures. The first priority should be to turn forests over to communities, vegetable and potato development, small surface—irrigation projects, development of the milk industry, and freeing up trade in fertilizers. Second, continued support should be given to the entrepreneurship programs, the expansion of the area under modified Taugya, community fuelwood and fodder-tree plantation, establishment of a self-help fund, support to farmers to start private nurseries, development of goat production, and development of soil productivity management activities. And third, people should make more use of credit from the ADBN; increase site-specific extension, giving special attention to women; and improve animal health and cross-breeding services.

The midterm evaluation again cautioned that change in the valley-hill complex would take time and that not all endeavors would meet the expected level of success. The present final evaluation takes into account the above project implementation history, but concentrates on the time since the midterm appraisal.

## **METHOD OF EVALUATION**

This final evaluation was carried out by a team of expatriate and Nepali consultants in January and February 1995. The team was led by a senior economist and included the experts in the following fields: natural resources management; soil, forest, and watershed management; livestock and fodder; horticulture; agriculture; rural development; and, administrative support.

The first week was spent retrieving documents; building up the team; interviewing key staff members of the government, donor groups, and USAID; and preparing an outline of the report. The second and third weeks were spent in field visits to four of the five project districts. Because of limited time, the team was unable to visit Rukum. The

fourth and fifth weeks were spent drafting the report and conducting further interviews with project-related staff. During the fifth week, a half-day seminar was presented by the team to HMG, USAID, and project-related staff. The remaining time was devoted to finalizing the report.

The team interviewed over 100 people and visited more than 50 sites where project interventions have been implemented.

As already mentioned the evaluation is primarily concerned with the period since 1991. However, the complete history of the project was reviewed since the team recognized that RDP's successes and failures are a direct result of its design formulated in 1978-80.

This report provides the statistics and background information needed to assess whether expected inputs and outputs have been met. It does not supply all the numerous figures, recommendations, and accomplishments presented in the many documents, particularly sector performance reports, listed in the References. Rather, it summarizes much of this information. Therefore, technical specialists are referred to those writings for a more detailed sector analysis of RDP's accomplishments and the technology applied.

## PROJECT OUTPUT AREAS

The RDP has increased the productivity of forests and farms, enhanced the environment, and provided additional roads. It has also promoted the formation of user groups, encouraged private enterprise, and expanded institutional capacity.

### FARM AND FOREST PRODUCTIVITY

The RDP has had only a small effect on average per capita income in the region as a whole. At the same time, it has had a major impact on the formation of forest user groups and on a wide range of output variables in the areas of concentrated effort.

#### Aggregate Impact on Output and Income

The RDP has focused on specific commodities and localities. Instead of aiming for an aggregate impact on output or incomes in the zone as a whole, the approach correctly, has been to emphasize doing the job right, at a reproducible level of effort, in specific pockets. The general spread of forestry and soil and water conservation activities is shown in figure 2-1 and the spread of agriculture, horticulture and livestock activities is shown in figure 2-2.

Nevertheless, the available aggregate output data merit some attention. The situation in the Dang district of the inner terai can be better understood against the backdrop of the terai districts as a whole, and the four hill districts (including Salyan, district, which had the largest project input) need to be seen in the context of all the hill districts. The data are taken from the National Planning Commission's recent adjustment of crop data. Data on food self-sufficiency and sources of cash incomes in the pockets of emphasis are also examined.

In the late 1970s, the roads (figure 2-3) and irrigation in Dang were far below the average for the terai. Thus it is not surprising that the district's record of growth, the yield and production of major field crops was worse than average up to the end of Phase I of the RDP (table 2-1). Although the comparative record was somewhat better from the inception of Phase II to 1990/91, potato, oilseed did much worse than the terai average. Indeed, oilseed yields and production declined consistently throughout the period. But the record in the terai as a whole was rather dismal. In comparison with other South Asian countries, Nepal's terai crop yields were consistently higher in the 1960s, but thereafter remained static, whereas these other countries experienced large increases.

Figure 2-1. Map Showing the General Spread of Forestry, Soil and Water Conservation Activities in Rapti

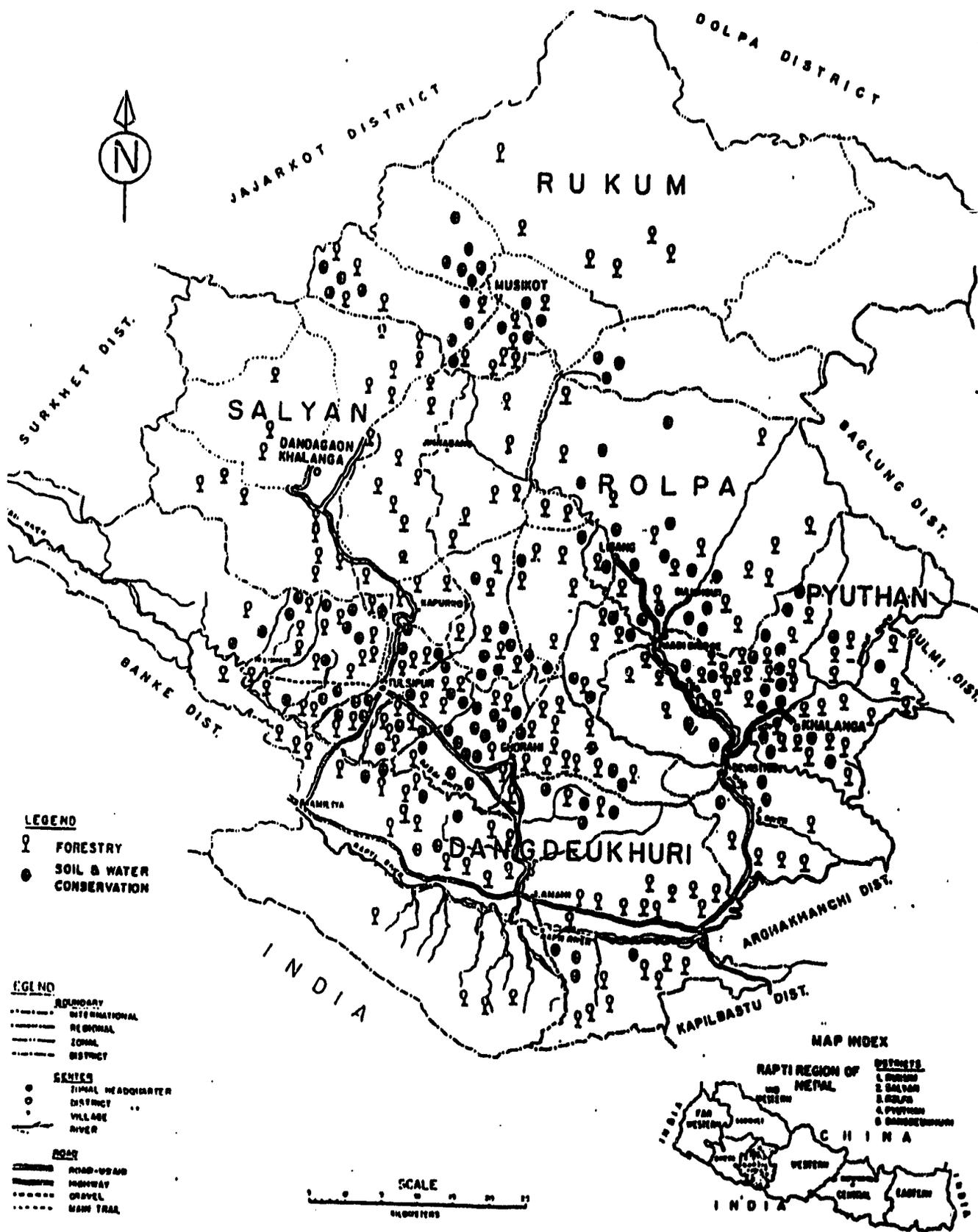


Figure 2-2. Map Showing the General Spread of Agriculture, Horticulture, and Livestock Activities in Rapti

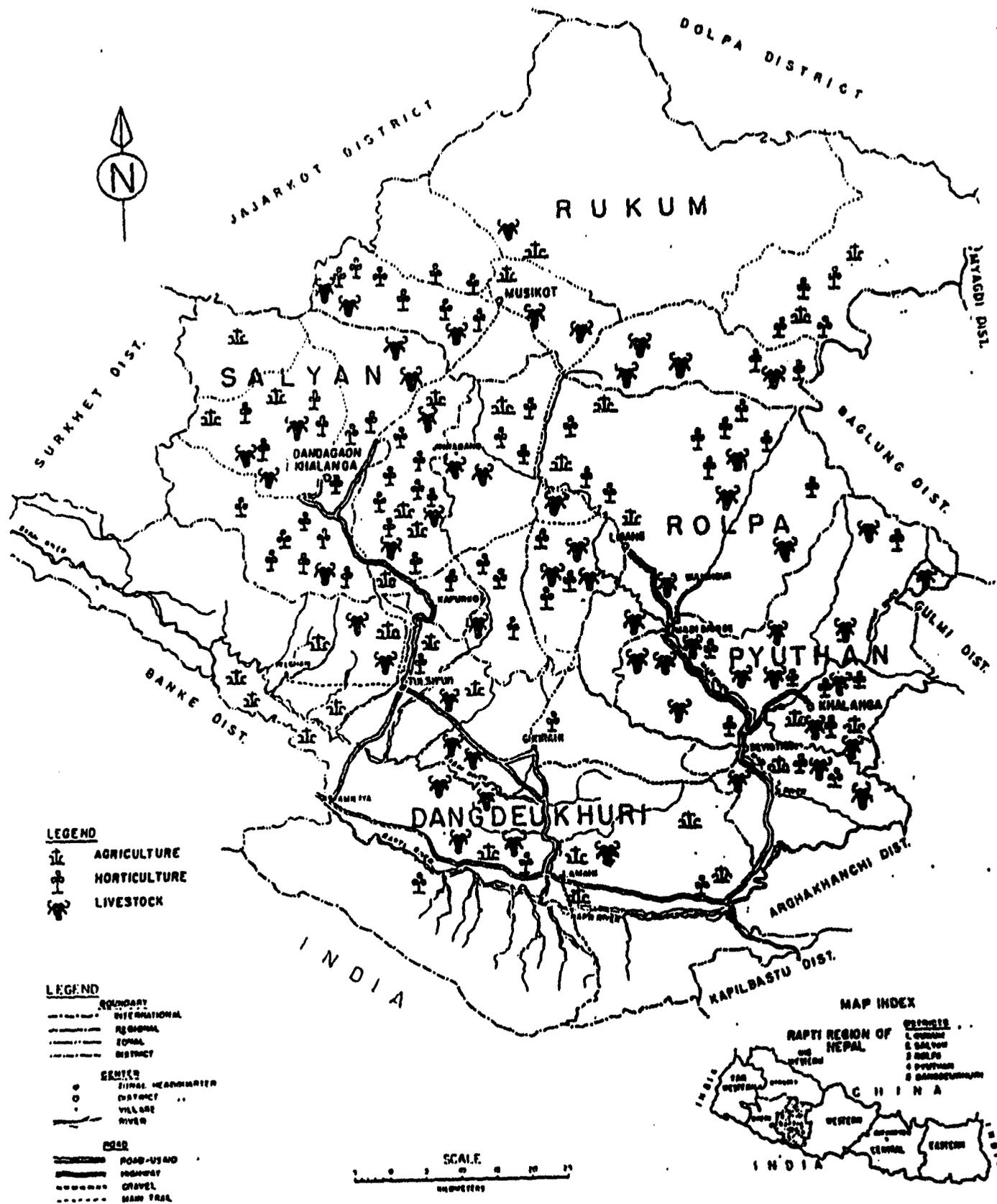
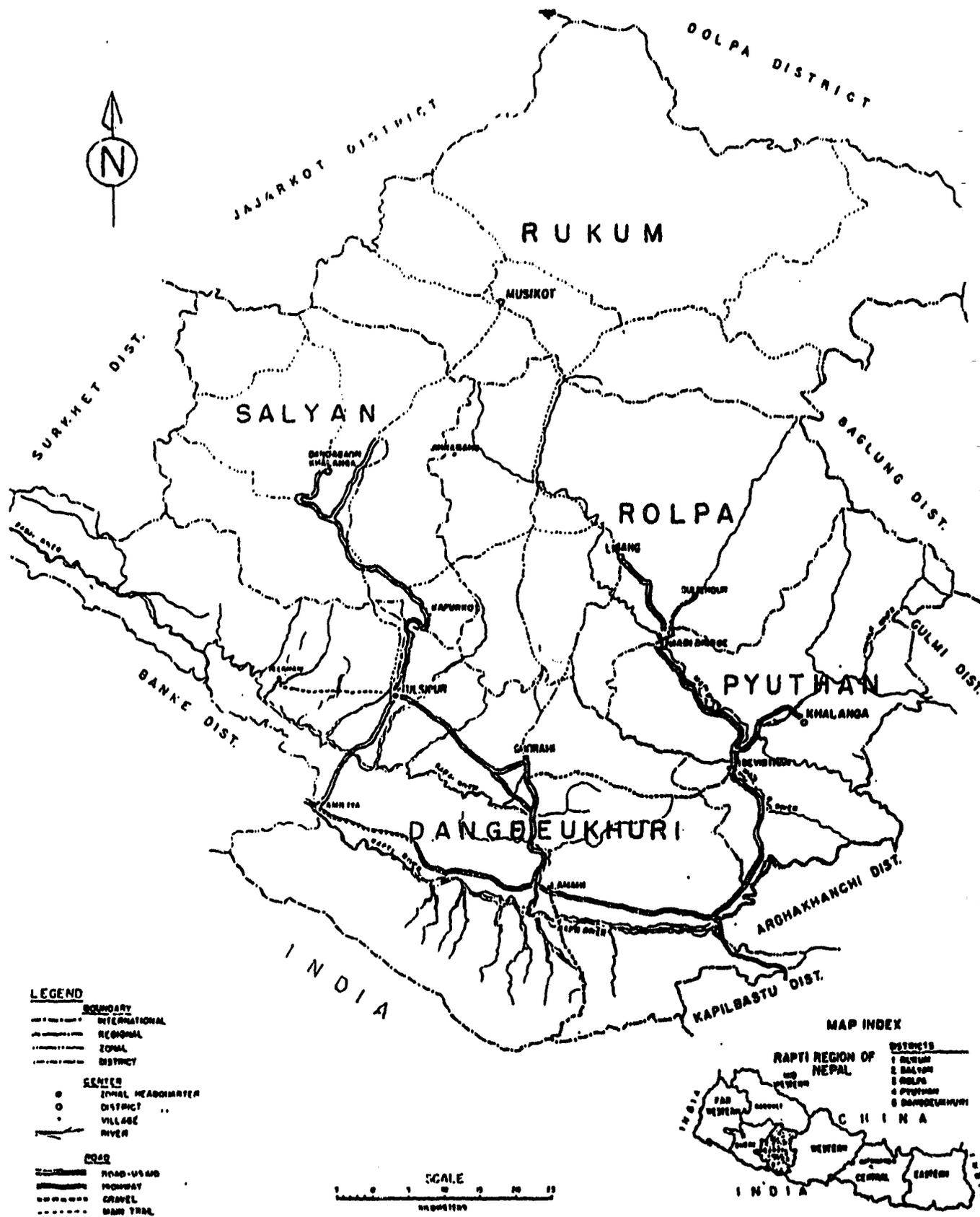


Figure 2-3. Road Network of the Rapti Zone



**Table 2-1. Increase in Production, Major Field Crops, Terai and Dang District, 1976/77 to 1990/91 (percent)**

<i>Crop and Region</i>	<i>1976/77-1985/86</i>		<i>1983/84-1990/91</i>	
	<i>Production</i>	<i>Yield</i>	<i>Production</i>	<i>Yield</i>
<b>Rice</b>				
Terai	18	17	17	17
Dang	9	4	33	23
<b>Maize</b>				
Terai				
Dang	5	4	12	7
	-14	-11	34	31
<b>Wheat</b>				
Terai				
Dang	46	24	28	18
	42	31	26	17
<b>Potato</b>				
Terai				
Dang	3	2	93	84
	12	2	54	46
<b>Oilseed</b>				
Terai				
Dang	6	-2	-2	-2
	-17	-13	-5	-8

*Source:* Based on data from Pokhrel and Shrestha (1994).

The hill record is comparable. In the earlier period, yield increases were the same or worse in the Rapti Zone and in Salyan district, compared with the hills overall (table 2-2). In contrast, potato and oilseed production did better than in the hills overall. This was entirely due to area expansion rather than yield. In the second period, the Rapti districts, particularly Salyan district, did better in rice production, largely because of better growth in yields, Salyan also showed better growth in potato. Even so, the production record in the major crops of the hills and the terai has been unimpressive.

**Table 2-2. Increase in Production of Major Field Crops, Hills, Rapti, and Salyan District, 1976/77 to 1990/91 (percent)**

<i>Crop and Region</i>	<i>1976/77-1978/79 to 1983/84-1985/86</i>		<i>1983/84-1985/86 to 1988/89-1990/91</i>	
	<i>Production</i>	<i>Yield</i>	<i>Production</i>	<i>Yield</i>
<b>Rice</b>				
Hills	-14	-15	16	15
Rapti	-25	-36	21	27
Salyan	-31	-34	35	26
<b>Maize</b>				
Hills	-19	-21	16	12
Rapti	-27	-28	19	-12
Salyan	-25	-24	9	7
<b>Wheat</b>				
Hills	24	-2	18	10
Rapti	8	-6	27	12
Salyan	-7	-24	32	16
<b>Potato</b>				
Hills	13	10	33	26
Rapti	9	13	33	20
Salyan	32	8	53	34
<b>Oilseed</b>				
Hills	22	9	9	5
Rapti	103	27	27	5
Salyan	14	25	25	6

*Source: Based on data from Pokhrel and Shrestha (1994).*

Food security, an important objective of development, has increased somewhat in recent years, but in the hills the state of technology for food crop production remains poor (a condition that improved research could change). Food security may better be achieved by increased cash crop production and the purchase of food. In the Dang Valley, the comparative advantage of food crops appears greater. The report presents data on food self-sufficiency for four Dang Valley villages in which the RDP had been active and two hill villages. The data are for the single years, 1987/88 and 1992/93. Single-year observations are of course shaky evidence, in view of agriculture's large weather-induced variations.

Food self-sufficiency improved in all four Dang Valley villages, which recorded a dramatic increase (table 2-3). The project contributed to these through the introduction of a greatly improved variety of potato, which may have had spillover effects. This was the period of maximum project success with potato. It should also be noted that yields throughout the terai had begun increasing during this period in response to much larger inputs of fertilizer. Project efforts probably increased the receptivity to those general changes in these impact villages.

*Table 2-3. Proportion of Households Achieving Food Self-sufficiency, 1989/90 and 1992/93 (percent)*

<i>Village</i>	<i>1987/88</i>	<i>1992/93</i>
Chakhaura(Dang)	65	88
Baibng(Dang)	40	60
Thapagaon(Dang)	50	70
Nayagaon(Hill)	70	70
Korbang Jhimpe(Hill)	75	80
Guruwagaon (Dang)	80	90

*Source: Rapti Development Project Annual Progress Report, 2050/51.*

The trends of particular interest in the two hill villages pertain to the sources of cash income. There was no increase in food self-sufficiency income in one of the villages and only a marginal increase in the other. In interviews with the mission, however, farmers expressed a readiness to reduce the area devoted to food crops in favor of high-income cash crops. In view of the poor state of food crop technology in the hills at present, food self-sufficiency can therefore be expected to drop with rising incomes in areas serviced by roads.

The survey data for four Dang Valley and three hill villages (the same villages as above, plus one more hill village) show a substantial increase in cash incomes in these cases as a whole (table 2-4). Because the data have not been adjusted for inflation, it is useful to examine the relative changes in cash income from various sources. The changes from in 1989/90 to 1992/93 are shown in table 2-5.

2-4. Cash Income by Sources, 1989/90 to 1992/93

Source	Chabkwa 1989/90 1992/93	Bairwa 1989/90 1992/93	Thabgaon 1989/90 1992/93	Narawa 1989/90 1992/93	Karwa 1989/90 1992/93	Karwa 1989/90 1992/93	Gurawa 1989/90 1992/93	Total 1989/90 1992/93
Wages	33,986	33,984	112,379	198,280	175,626	189,346	24,600	1,147,329
Crops	122,989	239,065	106,315	163,181	198,582	286,734	17,900	1,189,001
Stock	18,140	33,994	32,705	60,435	76,392	110,235	47,890	754,720
Wages	100	460	24,030	24,130	52,737	43,200	—	87,540
Wages	0	0	0	0	—	0	—	8,800
Wages (India)	0	10,000	10,300	42,000	45,500	176,000	133,800	240,400
Wages (Nepal)	52,400	230,991	319,795	397,700	525,205	656,190	195,446	2,386,383
hold no.	41	39	90	31	17	39	39	296

Source: Rapid Development Project, Household Survey.

1-5. Increase in Cash Income by Source, 1989/90 to 1992/93 (change)

Source	Chabkwa	Bairwa	Thabgaon	Narawa	Karwa	Karwa	Gurawa	Total
Wages	18	76	8	4	43	167	8	19
Crops	91	54	44	178	14	49	20	46
Stock	89	82	45	79	26	20	26	43
Wages	360	4	4	18	54	28	NA	8
Wages (India)	0	0	0	0	0	0	0	13
Wages (Nepal)	342	38	25	48	0	53	32	41
hold no.	141	42	24	26	29	35	18	33

n.a. = not applicable  
Source: Calculated from table 2-4.

For the seven sites as a whole, cash income increased by 33 percent, but this was barely in advance of the rate of inflation, which was approaching 30 percent. During this period, cash income from India declined 13 percent (more nearly 40 percent in real terms). At the same time, the cash income from crops, livestock, and services in Nepal rose by more than 40 percent. Adjusted for inflation, the growth in cash income from those sources amounts to more than 3 percent. Cash income from cereals rose substantially less than the inflation rate, possibly because families retained more of home production for their own consumption, or some villages may have transferred cereals areas to cash crops and thereby markedly increased their purchasing power and cereals consumption.

The cash income from India declined because fewer men found it necessary to seek migrant work in order to provide for family survival. Instead, they were able to earn a higher income locally, and keep their families together. This must be considered a highly desirable project outcome.

The increase in cash income, both in percentage and absolute terms, occurred in the very poor Tharu village of Chakhaura, in Dang. The greatest increase was related to services but the cash crop and livestock sources almost doubled. The project had a large impact here because of the measures taken to organize farmer groups, introduce soil conservation and thereby cash income on poor eroded land, promote women's literacy and improve potato and mustard yields. The results shows what can be done in communities previously considered greatly depressed and disadvantaged by social factors.

## **Field Crops**

Paddy, maize, and wheat are the major cereal crops in the Rapti Zone. They are grown mainly in the valley of Dang Deukhuri, in the foothills, and along the rivers of the other four hill districts. Potato is grown in all five of the zone's districts, but the project has concentrated mainly on Dang and Salyan districts. Mustard is the traditional export commodity, especially in Dang, although it is cultivated to a limited extent in other districts as well.

The productivity of field crops has been improved mainly by substituting high-yielding varieties for the local varieties. This effort has been accompanied by increased use of and improved access to other inputs—primarily chemical fertilizers and irrigation water. Agricultural extension programs such as demonstrations, farmer training, and tours are used to increase farmers' awareness and acceptance of high-yielding technologies. This is done through farmer's groups organized around commodities of high priority. Village workshops and collaborative programs are also used to involve farmers in extension planning and field trials through workshops and *haat bazar* demonstrating entrepreneurial techniques. Attention has also been given to enhancing to marketing of priority commodities.

**APPROPRIATENESS OF TECHNOLOGY.** As already mentioned, the RDP strategy for improving the productivity of field crops has been to promote high-yielding varieties. The following are the improved varieties introduced in the pocket areas through the line agencies:

Rice : Bindeswori, IR8423, Radha-7 and Radha-9.  
 Maize: Rampur composite, Manakamana-1, and Arun-2.  
 Wheat: UP-262, NL-297, and BL-1022.

Under the RDP, there has been an increase in the adoption of improved technologies, and farmers appear to be impressed with the results. During the field visit, a farmer in Chakkhaura reported that Bindeswori rice was yielding as much as 3,676 kilograms per hectare (50 muri/bigha), where as the local "simtharo" had only produced 441 kilograms per hectare (6 muri/Bigha) with last season.

According to a study of a large-scale demonstration of maize seed production conducted in three areas of the project (see Maize Report 1994), farmers tend to prefer Rampur composite, and Manakamana-1 maize. The response to Manakamana-1 has been particularly favorable because of its high yield 4.92 metric ton per hectare versus 4.08 metric tons per hectare for local varieties even under poor rainfall conditions. Furthermore, it requires no lodging, has better taste and a white color, and commands a high price as seed. Rapti farmers would therefore like to continue producing seed (obtained during a field visit in Nayagaon; Pyuthan).

RDP also tested improved varieties of mustard and potato seed that promised higher yields than local varieties. One of these was the *Vikash* variety of mustard, which was tested in collaboration with District Agriculture Development Office (DADO) and the farmers at priority sites. The high-yielding potential of this variety can be seen in table 2-6, which summarizes the results for RDP-introduced mustard and potato varieties at sites in Dang district.

Table 2-6. Summary of Crop-Cut Yield and Net Income in Thapagaon and Chakkhaura

Site and Crop	Variety	Yield(mt/ha)	Net Income (Rs.)
<u>Thapagaon</u>			
Potato	MS 42.3	26.90	105,647.80
	Local	10.90	46,025.00
Mustard Seed	Vikash	1.336	19,183.00
	Local	0.876	12,020.00
<u>Chakkhaura</u>			
Potato	MS 42.3	31.00	125,887.00
	Local	14.00	50,625.00
Mustard	Vikash	1.336	19,183.00
	Local	0.871	12,020.00

Source: RDP/Tulsipur during field visit.

Several conclusions can be drawn from the RDP's large-plot demonstrations of potato, mustard, and farmer—managed maize seed production.

The potato demonstrations were carried out at Thapagaon, Chakhaura, Baibang, Lamahi, Khorbang, and Nayagaon. They indicated that large-plot demonstration is effective; MS 42.3 provides an opportunity for increasing productivity; fertility management affects yield; MS 42.3 Cultivar is more profitable; MS 42.3 is highly tolerant to late blight disease; and MS 42.3 may provide an opportunity for double crop.

The mustard demonstrations took place at Thapagaon, Persadua, Chakhaura, and Baibang. Here, the results showed that large plot demonstrations are effective; *vikash* cultivar has the potential to produce high yields; the cultivation of improved mustard is profitable; legume intercropping may provide additional benefits; bee-keeping may be helpful; and seed quality affects the yield potential.

The maize demonstrations occurred at Thapagaon, Chakhaura, and Nayagaon. They indicated that improved cultivar has the potential for high yield; fertility management affects the yield potential; optimum plant population (55,000/hectares) is important; improved cultivar is more profitable than unimproved cultivar.

Farmers of Dang were highly satisfied with the harvests obtained with improved varieties of mustard, potato, and maize. As a result, some farmers in Pyuthan expressed an interest in expanding the cultivation of MS 42.3 potato and *vikash* mustard. Rolpa farmers have yet to adopt such technologies, although they have been seen planting other varieties of potato and mustard.

RDP's large-plot demonstrations and other extension activities, were accomplished by training and advice provided through farmer groups. In Nayagaon, for example, Pyuthan farmers were organized into commodity groups (wheat groups, vegetable groups, potato groups etc.). There were also women's groups, male farmer groups, and mixed groups, organized to receive extension support from line agencies. Such groups pertain only to production matters, however. Marketing is done by individual members on their own.

Some farmers in Dang participated in the project-facilitated "workshop" on marketing. There they met traders with whom they were able to establish marketing links for their surpluses. During a visit to the weekly trading event called *haat bazar* by the project in Bijuwar, Pyuthan, the chairman of a nine-member *haat bazar* committee reported that the market mechanism was new to local tradition and is being slowly accepted by local traders and buyers in an effort to move to organized agricultural marketing.

Individual agricultural entrepreneurs dealing in seed multiplication and the procurement and selling of chemical fertilizer and pesticides have been found doing business mainly in Tulsipur, Ghorahi, Lamahi of Dang Deukhuri, and Devasthan, Bijuwar, and Khalanga of Pyuthan. Marketing activities of the type have yet to reach Rolpa district. In the absence of appropriate marketing support, farmers there rely on the limited absorption by the Libang consumers.

The various women's groups have been observed promoting seed production and potato and other vegetable production as a means of generating income. Adult literacy

activities have provided an entry point to such activities. Participants appear to be active and assertive on issues related to women's welfare.

The DADO, as the key line agency, has accepted the idea that farmer's groups can be used to educate and help farmers improve their harvest through a wide range of activities, the production cash and cereal crops. As the line agency, DADO focuses on specific commodities and locations. Its recommendations concerning methods of increasing productivity and income appear to be gaining interest and are being put into practice, as is evident from field visits and the annual program reports of DADOs in Dang, Pyuthan, and Rolpa districts.

Large-plot demonstration models focusing on strategic crops in pocket areas therefore appear to be appropriate for wider adoption and replication.

**Table 2-7. Yield of Rice, Maize and Wheat, Nepal Rapti Zone and Five Districts, 1987/88 to 1991/92**  
(kilograms per hectare)

Crop	Dang		Salyan		Pyuthan		Rolpa		Rukum		Rapti Zone		Nepal	
	1987/88	1991/92	1987/88	1991/92	1987/88	1991/92	1987/88	1991/92	1987/88	1991/92	1987/88	1991/92	1987/88	1991/92
Rice	2,018	1,643	1,700	1,747	1,968	1,815	1,499	1,683	1,697	2,000	1,914.90	1,702.52	2,089	2,283
PC <sup>a</sup>	-18.58		2.76		-7.77		12.27		17.86		-11.89		9.29	
Maize	1,406	1,905	1,050	1,354	1,300	1,194	1,600	1,787	1,200	1,374	1,275.70	1,525.77	1,338	1,598
PC	35.49		28.95		-8.15		11.69		14.50		-19.60		19.43	
Wheat	1,499	1,496	8,500	1,000	607	1,022	799	998	900	966	1,012.99	1,149.88	1,246	1,364
PC	-0.20		-17.65		68.37		24.91		10.67		13.51		9.47	

a. PC = Percentage change.

Source: Pokharel and Shrestha (1994).

**Table 2-8. Yield of Cash Crops, Nepal, Rapti Zone and Five Districts, 1987/88 to 1991/92**  
(kilograms per hectare)

Crop	Dang		Salyan		Pyuthan		Rolpa		Rukum		Rapti Zone		Nepal	
	1987/88	1991/92	1987/88	1991/92	1987/88	1991/92	1987/88	1991/92	1987/88	1991/92	1987/88	1991/92	1987/88	1991/92
Potato	8,000	8,553	7,000	9,000	5,000	7,739	6,000	7,782	6,500	6,500	6,502.34	7,650.63	7,021	8,549
PC <sup>a</sup>	6.91		28.57		54.78		29.70		0		17.66		21.76	
Oilseed	700	650	500	566	614	508	556	600	500	548	680.75	887.53	624	569
PC	-7.14		13.20		-8.63		7.91		9.60		30.37		-8.81	

a. PC = Percentage change.

Source: Pokharel and Shrestha (1994).

**CONTRIBUTION TO PRODUCTIVITY.** The productivity of Rapti farmers has begun to show an improvement in the pocket areas, but the aggregate effect is not yet clear. Table 2-7 provides comparative data on rice, wheat, and maize yields. So far, only maize and wheat have started contributing to changes in aggregate productivity in Rapti.

According to the RDP Performance Report for the Agriculture Sector (1987/88-1993/94), the area under potato cultivation has doubled, and production has trebled over the past seven years. The growth in productivity is attributed to the increased use of high-yielding varieties and new cultivation practices. Under the RDP, technical assistance with vegetable, fruit, and cash crops VFC was directed to seed potato farmers in selected communities of Dang and the hills. The DADOs, backed by the National Potato Development Program, provided training and seed potato to farmers.

Table 2-8 shows the data on potato and oilseed (mainly mustard) yields in Nepal, the entire Rapti Zone, and each of Rapti's five districts. Activities in Salyan appear to be having some impact on aggregate productivity, but in the case of the oilseed, the impact of RDP in the pockets has yet to spread to the entire zone.

**SUSTAINABILITY.** The RDP approach of focusing development efforts on strategic commodities and using location-specific technologies under the management of farmers' group appears to have been well received, particularly in the cultivation of potato and mustard as cash crops. The introduction of the high-yielding vikash mustard in the cropping pattern seems to fit well with farmer's available resources. Farmers have been trained in seed multiplication, although foundation seed (mustard is cross-pollinated) may be needed every three years to maintain genetic potential. Farmers have reported that harvests of vikash mustard were better with two rather than single irrigations. Therefore good irrigation may be needed to ensure wider adoption of the new varieties both in the and out of the Rapti Zone.

With regard to potato varieties, the MS 42.3 potato introduced under RDP has been well received in the pocket areas. It is suitable for in areas of low elevation. Its short germination permits two crops a year. During the field visit, someone mentioned that MS 42.3 is susceptible to wart disease, but no such problem was noted or reported.

Whether project-supported activities in the area of rice, wheat and maize production can be sustained depends to some extent on the DADOs of the Rapti districts. Improved crop varieties, along with research and input backing from various line agencies, have been introduced or expanded in much of the district. The emphasis on strategic commodities and geographical sites has yet to materialize to a significant degree in the annual programming and implementation process. And DADO activities have not yet spread throughout the district.

The farmer's group approach, however, has been well received by the DADOs, which are hoping to organize cereal grain farmers for extension, training, and input support as to help them achieve a better harvest. The DADOs have found RDP advisers helpful to the DADOs in implementing the farmer's group approach, village workshops, and farmers collaborative trials, including large-plot demonstrations. Nevertheless cereal crop groups appear unorganized and ill-prepared for extension and input support from

the line agencies. They are also left to do all the postharvest activities individually. As a result, the sustainability of the participatory and group mechanism will depend on greater commitment and patience by the DADOs.

From the perspective of sustainability, the first step in improving technology and extension delivery should be to clearly delineate the roles of the different actors involved. At present, for example, there is no link between NARC and RDP-supported potato farmers. Such a link is vital to bring research support to the farmers. Sustainability has also been adversely affected by the DADO's failure to focus its resources on strategic commodities and sites. And despite the efforts of traders and buyers to demonstrate marketing principles in *haat bazar* and in the "workshops", sustainable changes among Rapti's farm producers can only come from a different outlook on marketing. That is, the farmers need to become aware of buyers and their needs.

### **Horticultural Crops**

Because of the wide variation in altitude and climate (from tropical to temperate), the Rapti Zone is suited to many horticultural crops: fresh vegetable, vegetable seeds, apples, citrus fruits, and spices such as ginger. In view of the Rapti's tremendous potential for horticultural development, the RDP launched a vegetable, fruit, and cash crops program on a commercial scale to increase household incomes and well-being. The program was also expected to improve the nutritional status of the population through improved productivity, market access, and sustainable resource management.

**APPROPRIATENESS OF TECHNOLOGY.** Under RDP, the commercial production of fresh vegetables has been intensified in selected pockets near roads and market centers. Improved varieties of vegetable seed have played a major role in the project. Indeed, the RDP's principle agricultural contribution is that the zone now produces more than 30 percent of the commercial vegetable seeds in Nepal (350 metric tons). Improved cabbages (Copenhagen market) and hybrid cabbages (KK cross, Green coronet, Bajrang), tomatoes (Pusa Ruby, Roma, Money Maker), radishes (Mino early, Toki Nase, a 40-day radish), broad-leaf mustard (Marpha), peas (Sikkim), onion (Red creole), cauliflower (Snowball-16, Kibo Giant), carrot (New Karoda), and beans (butter bean) have been introduced mainly to meet the local demand for vegetables. Some heat-resistant cabbages (KK cross, Green coronet), radishes (Toki Nase, 40-day), and carrots (New Karoda) have also been introduced. These have enhanced the production of fresh vegetables and made them available in markets for a longer period.

Because early and off-season vegetables provide farmers a better income, the RDP's vegetable, fruit, and cash crops program has focused mainly on producing off-season vegetables in the hills. It has been found that such can be grown in the nonirrigated rainfed areas of the mid-hills by utilizing monsoon rainwater and its residual soil moisture. These off-season vegetables are cultivated mainly from May to October. At present, only selected vegetables such as peas, cauliflower, tomato, beans, and

radishes are being produced off-season. They are grown in the hills near the road, especially near Kapurkot (Salyan).

Another production strategy adopted by the farmers of the Rapti Zone has been to raise seedlings in nursery beds under a plastic cover. Sprinkler irrigation has also been introduced in some pockets to facilitate the production of fresh vegetables. The production of vegetable seed is one of the RDP's top priorities and is being carried out through the VFC program. The cool climate of the Rapti hills and mountains is highly suitable for producing vegetable seeds. Prospects appear particularly good for the production of cauliflower, cabbage, carrot, radish, and broad-leaf mustard seeds, all of which have a big export market demand as well. At present, seed production is focusing on radish (Mino early, Toki Nase), broad-leaf mustard (Marpha), and cauliflower (Snow ball-16).

Simple technologies have proved effective and appropriate in the zone. These include raising seedlings under a plastic cover, thinning and maintaining distances between plants in directly sown radish seeds, line sowing of seeds and seedlings, transplanting in time, roguing out the off-type plants, growing one variety of vegetable at one village (to keep the stock isolated and maintain the purity of seed), clean cultivation, introducing methods of plant protection and the use of foundation seeds, irrigation methods, manures, and fertilizer. Technology has been transferred effectively through training and visits.

Road connection in the Rapti Zone has given an impetus to increasing the area devoted to VFC, especially apples. As a result, popular apple varieties such as Royal delicious, Red delicious and Golden delicious are now being cultivated in the zone. Citrus fruit has been cultivated traditionally in the Salyan and Pyuthan districts of the Rapti Zone. With the establishment of private nurseries for the production and supply of fruit plants, the planting of fruit trees has expanded greatly.

In particular, the VFC programs have helped farmers learn how to lay out orchards, plant in pits, prune and train suppliers, spray, apply manure and fertilizer, intercultivate potato and vegetables, and manage apple orchards better. Some techniques of apple cultivation that local villagers learned in Himachal Pradesh, India, have also proved useful.

Using grafted apple plants available locally, farmers have been able to bring more areas under apple plantation every year. Basic horticultural tools have been available at concessional rates to encourage them to continue these endeavors. Improved methods of handling, packaging, and transporting the harvested apples are also developing slowly. In addition, the production of apple products (dried slices, jam, jelly, and juice) has been initiated and is being practiced to some extent.

Grafted citrus plants have also been made available through private nurseries established with the help of the project. These nurseries have facilitated the expansion of young orchards. Trifoliate orange is used as rootstock for raising orange grafts. Budded plants are bearing fruit that appears to be of good quality. A popular variety of sweet orange known as "Junar" in Eastern Nepal has been introduced in Salyan. Some plants have already started to yield fruit.

The technologies introduced under the project have also been of assistance to ginger growers. They have helped control rhizome rot of ginger, increased the use of chemical fertilizers, and improved the marketing of mother rhizomes before harvesting to obtain better prices. Ginger prices have also improved since the establishment of a collection center at Kapurkot with price information.

**CONTRIBUTION OF PRODUCTIVITY.** With the introduction of improved varieties of vegetable seeds and better techniques of cultivation, the area and production of vegetables (fresh as well as off-season) and vegetable seeds have increased tremendously. Many irrigated fields in the lower part of Darimjeula (Korbang VDC) and Barela (Kajevi VDC) of Salyan district have begun producing radish seed (in 1994 14 metric ton of radish seed was sold from Barela). Farmers' income has increased by 20 to 50 percent. With the specialization and commercialization of vegetable cultivation, farmers have increased their cash income. Apple production in Jinabang is providing a net income of Rs 100,000 per hectare at full production. Apples provide more income than vegetable seeds. The increase in the quantity of vegetables, vegetable seeds, and fruits (apple/citrus) sold and the rise in farmers' income are clear indications of the project's contribution to productivity. Productivity of ginger has increased from 8 metric tons per hectare to 11.5 metric tons per hectare.

**SUSTAINABILITY.** The production of vegetables (mainly off-season) and vegetable seeds is highly sustainable because of the high demand for these items in the marketplace, the prices they command, and their strong links to the established market network. This holds equally for apples and ginger.

## **Livestock**

Livestock production in the Rapti Zone covers a great variety of animals and birds and is carried out under a wide range of conditions. As a result, livestock activities under the RDP are highly diverse. When the commercialization of livestock production becomes more feasible, attention will be concentrated on a smaller number of activities. In the present circumstances, the diversity is desirable from farmer's point of view.

**APPROPRIATENESS OF TECHNOLOGY.** The project has introduced Pakhribas black pig to the Tharu Community. Farmers find the pig socially acceptable and easy to raise with the same type of feed used for local pigs. The RDP's efforts to a Pakhribas black pig breeding society in the Tharu villages of Shishniya, Thalagaon, Chakhaura, and Dhanpurwa can be considered a major milestone in persuading the underprivileged community there to adopt a scientific and systematic breeding scheme.

The formation of the Dangapari Goat Breeding Society was found to be most appropriate. The crossbreeds retained the prolific character of the local Kathey goat combined with a good growth rate and better kid survivability due to the infusion of better Jamunapari genes, particularly those favoring good milk production and range-grazing habits. The systematic breeding scheme recommended by the RDP technical assistance team has been greatly appreciated by the farmers. They have come to recognize that it is necessary to maintain production standards in order to obtain higher prices, which can be at least 50 percent higher than prices for the local Kathey goat. Similarly, the crossbreeds of Jamunapari and local hill goats at Rolpa were found to be quite satisfactory up to the elevation of 1,200-1,500 meters under the traditional grazing system.

The introduction of Murrah and its crossbreeds over the past decade in the Dang Valley and in the hill districts of the Rapti Zone up to elevations of 2,000 meters has been appropriate and accepted by the various communities in the zone. Most of the farmers were happy to purchase graded Murrah from across the border and raise it for profit.

A small herd of 20 Barbari was introduced in the Dandakuti areas of Dang district with assistance of the ADBN as core capital. The support the technical assistance team could become a resource for a significant Barbari in the Dang district.

Another important measure has been the RDP's introduction of stylo and molasses grass in the community forest plantation areas, especially these under sal and pine forests and winter forage (oats, vetch and berseem) for buffalo raisers. The fodder and seed production capability of the stylo, molasses, oats, and vetch has been well demonstrated in Dang, Salyan, and Pyuthan districts by the farmers themselves, especially the women. The steps taken to increase fodder production during the critical winter months with oats and vetch or berseem and in summer with style, molasses, siratro, and desmodium species has been popular. The cultivation of Napier along fence and border lines and below watersheds has gradually improved the fodder supply, promoted stall feeding of animals, and stopped the degradation of the forest environment.

Although fodder trees have received considerable emphasis in the RDP zone, the success rate of the program seems to be well below 20 percent, owing to the small size of seedlings, the choice of species (which does not meet farmers' demand), and inadequate care of and poor knowledge about cultivation practices. The situation appears to be improving now that the farmer's choice species are being distributed in the project area.

**CONTRIBUTION TO PRODUCTIVITY.** Tharu communities have found Pakhribas black pig to be a good producer. It can attain a weight of 30-35 kilograms at six months of age compared with 20-25 kilograms for local pigs and 30 kilograms for its crossbreeds. In addition, farmers are able to sell Pakhribas piglets for Rs 1,100-1,200 a pair compared with Rs 300-400 for a pair of local piglets.

The Dangapari goat can attain a weight of 10-11 kilograms at six months of age and 30-50 kilograms at one and a half years, whereas the local Kathey weighs only 5.0

kilograms and 25-35 kilograms at these stages. The Dangapari had the same rate of kidding (130-150 percent) as the local goat. The Dangapari Goat Breeding Society sold more than 350 goats during the past six years. The project has distributed 437 Jamunapari bucks and 20 does in different districts of the Rapti Zone. More and more farmers have been attracted to Dangapari goats, because they can thrive better than others under the extensive grazing management system practiced by goat raisers in the region.

Under the prevailing management system adopted by the Rapti farmers, the Murrah crossbreeds produce about 952 liters of milk per 323 days of lactation. By contrast, the production capacity of the local buffalo is 634 liters per lactation. The crossbreed animals give about 50 percent more milk and the farmers make Rs 5,000-10,000 as a net profit after deducting feed and fodder cost. About 139 Murrah bulls and 280 buffalo have been distributed in the RDP zone. However, farmers are buying Murrah crossbreeds from India with their own resources. As a result, the total crossbreed buffalo population in the zone is estimated to be at least 7-10 percent.

The Barbari goat has proved to be very prolific. The kidding rate in the herd is now about 129 percent, and the animal can breed three times in two years. This breed is well adapted to stall feeding. The meat production potential of this breed is well recognized by the farmers. The breeding Barbari brings a price of Rs 1,700-1,800 compared with Rs 1,200-1,500 for local animals. This breed is becoming very popular because it is more productive and easier to raise.

In fodder production trials conducted by the project, total forage (fresh weight) produced from stylo averaged 18.6 metric tons per hectare as compared with 9.1 metric tons per hectare from local thatch grasses. The farmers have come to recognize the better nutritive value of dry stylo leaves and broken stems from seed threshing as leguminous masoor bhusa (lentil bran). This led them to grow more stylo in community forests, plantation areas, and subwatersheds. Although the productivity of other winter fodder species has not been adequately assessed, farmers can expect to produce at least 30 percent more milk by feeding their animals the winter fodder such as oats, vetch, and berseem. The massive plantation of over 242,000 Napier sets has drastically improved the fodder situation.

Livestock groups in the project area have produced up to 20 metric tons of winter forage seed (mainly oats, vetch, and berseem) and have sold more than 14 metric tons of seeds. Under the RDP, the number of fodder development sites has increased from 83, and the cover from 218 hectares from the initial 6 hectares at the early stage of the project. Furthermore, 163 hectares of community lands has been brought under improved fodder. The Forest User Groups have already sold Rs 79,000 worth of subtropical grass seeds, mainly stylo, molasses, and desmodium. The farmers have come to recognize the potential of fodder seed production as a new income-generating activity, along with firewood and timber production from their community managed forests.

Although massive numbers of fodder tree seedlings (1.3 million) have been planted on private and community lands, the survival rate, which is about 25 percent, is still poor. Thirteen nurseries managed by livestock groups produced 18 percent of the seedlings out of the total 129 nurseries functioning in the region.

**SUSTAINABILITY.** The demand for Pakhribas black pig is beyond expectation in the RDP region as well as in the adjoining zones of Mahakali, Bheri, and Lumbini. The interest in raising Pakhribas black pig among the people of the Tharu community is increasing.

Farmers recognize that breeding controls are required to sustain the production capacity of the Dangapari goat, but they are confident that they can meet the necessary standard. The whole breeding and production program can easily be duplicated in adjoining districts once the farmers there are convinced of its importance.

The production potential of the Murrah crossbreeds is well-established among the Rapti farmers and also in other areas of Nepal. However, the expansion of the crossbreed production program hinges on the expansion of the milk market and marketing system.

The establishment of a Barbari goat herd in the Dang Valley will prove to be a fruitful investment provided that farmers are trained to feed them well under a stall-feeding system and avoid grazing in the forest areas, especially during the rainy season.

Increased fodder and seed production from community forests sites has been a major breakthrough in generating cash income from the sale of fodder seeds. This program is gaining momentum, and it is in great demand among other forest user groups. Buffalo farmers have responded well to the on-farm production of fodder such as oats, vetch, and berseem, and such production should be promoted further. The cultivation of Napier along with fodder legumes can be further expanded in the subwatershed areas, on community lands, and along farm fences and terraces. This approach would not only improve farmers' fodder production capability but would also reduce their dependency on forests and prevent on-farm soil erosion. At the same time, the fodder tree promotion program must respond to the farmers' demand for deciduous rather than pine species.

## **Forestry**

Nepal has 5.6 million hectares of forests, of which 532,982 hectares lie in the Rapti Zone. As in other regions of Nepal, forests in the Rapti Zone are a vital natural resource. The rural people depend on forests for timber, poles, fuelwood, fodder, leaf litter, grass, and a variety of other nonwood products. Many landless people and farmers earn part of their livelihood by selling fuelwood, medicinal herbs, and other forest products.

Clearly, Nepal's agriculture, animal husbandry, water resources, cottage industries, and ecotourism depend on the status of its forests and forestry. Therefore, it was natural for RDP to give high priority to forestry components (as well as soil conservation, which is discussed separately in another section).

**APPROPRIATENESS OF TECHNOLOGY.** The management and use of Nepal's forests have undergone several radical changes over the past 50 years. Up to 1957 forests were protected or managed by the traditional system: forests were under the constant watch of land revenue collectors, and records were kept by overlords. No one was allowed to

cut or use forest products indiscriminantly. The population was low and kept to a self-disciplined system to protect the forest.

With the passage of the Private Forest Nationalization Act in 1957, all of Nepal's forests were brought under the government. As a result, land ownership became uncertain, and major forest felling began in an attempt to establish ownership rights and bring into crop production land that was protected prior to 1957. Unfortunately, the Forest Department did not have the wherewithal to administer the so-called national forests. Meanwhile, Nepal's population was demanding more wood for fuel and house construction, as well as fodder and forest litter for its animals.

Alarmed by the extensive clearing of forests, the government passed legislation in 1978 establishing several categories of forests—Panchayat forests, Panchayat protected forests, leasehold forests, and private forests—which provided the legal foundation for community-managed forestlands. Local control of forests was further strengthened in 1982 with the passage of the decentralization act. However, it took 15 years to develop the mechanism, policy, and motivation to intimately involve communities in forestry.

In the Rapti Zone, forest degradation reached its peak in 1968–78. The forest was then considered a common resource and the Forest Department had only a small staff. Following the democratic revolution of 1990, attention turned to the recommendations of the Master Plan's Forestry Sector spearheaded by foreign donors which included USAID. Under Forestry Act 2050 of 1993, the government authorized District Forest Officers to turn over part of the national forest to user groups. The act specifically entitles the community to develop, conserve use, manage, sell, and distribute forest products by independently fixing prices according to an operational plan. But actual land ownership is retained by the state. Only a few scattered woodlots and trees are now privately owned.

The Act has aimed for an effective management of forests by communities, especially in the hill districts by cutting unnecessary red-tapism within DOR and the local governments. It is envisaged that the new act will empower local communities to enhance the sustainable use and management of their local forest resource through more motivated efforts in decision marketing.

Nepal's community forestry programs are based on indigenous and traditional systems of forest protection and product distribution. Communities manage 50,000 hectares of Nepal's forestland. About 61 percent of the nation's forests are potentially suitable for community forestry. To date only 2–3 percent have formally been turned over to user-group management. Since 1988, about 27,157 hectares of Rapti forests have been under the management of 523 forestry user groups (FUG). This represent more than 50 percent of the national total and about 11 percent of forestland within the zone. Within Salyan district, 42 percent of the forestland identified as suitable (accessible) for community forest is now being managed by FUGs. The forests range in size from several hectares to upward of 700 hectares, the average being about 80 hectares.

Community forestry in the Chir pine region of Salyan could have been increased another few thousand hectares had it not been for a resin extraction contract that extends to 1999. The local government and people are unhappy that a portion of the revenue from the operation does not come to them.

The Rapti Zone contains several ecological types of forests, ranging from tropical through subtropical to temperate and alpine communities. The more important of these forest types are briefly described below.

Sal (*Shorea robusta*) forests are abundant in the zone's tropical (below 1,000 meters) and subtropical (1,000-1,500 meters) regions. Species *Bot dhaenro* (*Lagerstroemia parviflora*), Dhauri (*Anoglessus latifolia*), and Karma (*Adina cordifolia*) grow in the dry areas; and species such as Asna (*Terminalla tomentosa*), Gutel (*Trewia nudiflora*), and Jamun (*Syzegium cumini*) are more common in the moist areas.

The Rapti Zone is devoid of terai physiography and thus its Sal forests are not of the more extensive and productive, terai-type. They are predominantly a shorter, statured hill type.

Khair (*Acacia Catechu*) and Sisso (*Dalbergia sisso*) flourish on Rapti's recent river deposits. Growing between the Khair-Sisso stands on the river banks and the Sal forests of the stabilized alluvial-colluvial deposits are tropical mixed forests. These forests consist of Semal (*Bombax ceiba*), black and white Siris (*Albizia lebbek* and *Albizia procera*), and other dry associates of Sal forests.

The subtropical slopes of the Siwalik and the midmountain regions are inhabited by a variety of mixed species. Smaller trees such as Amla (*Embellica officinalis*) occur on the drier south-facing slopes, while Chilaune (*Schima wallichii*), Katus (*Castanopsis*), and a number of species of the *Lauraceae* family are common on the moist soils and northern slopes.

Chir pine (*Pinus longifolia*) is the main species between 1,000 meters and 2,000 meters along with only a scanty ground flora of shrubs and herbs. Because the ground litter of pine needles is collected or burned each year, surface soils are easily eroded. Alder (*Alnus nepalensis*) and a variety of shrubs are found along streams and their banks.

The upper reaches of the Chir pine forests and areas above 2,000 meters are home to a number of broad-leaved species, such as Gurans (rhododendron species) Banjh (*Quercus lanata*), Khasru (*Quescus dilatata*), Phalant (*Q. glauca*), and Paiyon (*Prunus cerasoides*).

Temperate coniferous forests are found only in the northern zone of Rolpa and most of the Rukum district. These forests comprise Blue pine (*Pinus wallichii*) above 2,000 meters Hemlock (*Tsuga brunoniana*) around 2,500 meters, and fir (*Abies pindrow*) and spruce (*Picea smythiana*) above 3,000 meters. Other rare coniferous species such as the Himalayan cypress (*Cupressus torulosa*) can be found on limestone soils, while the Himalayan yew (*Taxus baccata*) thrives in the moist localities. Other broad-leaved trees in this zone include a number of rhododendron species, walnut (*Juglans regia*), horse chestnut (*Aesculus indica*), and *Quercus semicarpifolia*.

Forest communities at the timberline consist of Bhojpatra (*Betula utilis*), shrubby juniper (*Juniperus recurva*) and shrubby rhododendrons.

**Table 2-9. Land Use: Nepal, Rapti Zone, and Districts, 1986**  
(hectares)

	<i>Cultivated land</i>	<i>Noncultivated inclusions</i>	<i>Grass land</i>	<i>Forested land</i>	<i>Shrub land</i>	<i>Other land</i>	<i>Total land</i>
Dang	68,346	12,438	8,905	180,115	17,158	10,377	297,339
Pyuthan	28,171	14,870	12,899	66,284	6,410	886	129,520
Rolpa	36,702	23,153	32,699	84,476	9,621	498	187,145
Rukum	28,415	16,855	53,086	128,471	7,981	55,837	290,675
Salyan	34,383	12,291	17,334	5,962	5,962	496	150,102
TRZ <sup>a</sup>	196,017	79,637	124,923	532,982	47,132	68,096	1,054,781
(percent)	(18.58)	(7.55)	(11.84)	(50.53)	(4.47)	(6.46)	(100.00)
Total, Nepal	2,968,100	986,900	1,757,100	5,616,800	689,900	2,729,600	1,4748,000
(percent)	(20.1)	(6.7)	(11.9)	(38.1)	(4.7)	(18.5)	(100.00)

a. TRZ = Total Rapti Zone.

Source: WECS, HMG (1986).

More than 50 percent of the land in Rapti is covered by forests, in contrast to 38 percent for the entire country (table 2-9). It is not clear, however, what percentage of these forests are accessible. Accessible forests are those available for community management. An estimated 61 percent of Nepal's forests are said to be accessible, which means 39 percent should be retained as national forest. Of the five Rapti districts, Salyan has identified areas of national forest and potential community forests. Salyan has a total of 101,547 hectares of forests, of which 84,343 hectares are classified as national forest and 17,204 hectares as potential community forests. About 7,216 hectares of community forests have been turned over to district FUGs. This amounts to 42 percent of the potential, which is considerably higher than both Rapti and national levels. This achievement is attributable to excellent extension work and road access.

The level is much lower in Rolpa District. It has about 94,000 hectares of forest, of which 90 percent (84,600 hectares) is considered accessible, but only 4,486 hectares have been turned over to community management. This amounts to a little more than 5 percent, which is less than the Rapti total.

Nepal's forests are divided into the following managerial categories:

1. National forests: These are extensive tracts of forests having significant production and protection values. They are managed by the Department of Forests under the Ministry of Forests and Soil Conservation. National forests are mainly in the terai region (which is outside the Rapti Zone), the Siwalik hills and valleys, and the High Mountain and Himalayan physiographic regions. Of the nation's 5.6 million hectares

of forested land, 39 percent contains national forests. However, these are not clearly demarcated for management. Certain physiographic regions and sparsely settled areas—such as the southwestern part of Salyan, the northwest of Dang, and Rukum—have a high percentage of commercially important forests. It will be in the national interest to keep most of these lands in national forests. Logging can be privately contracted by timber companies, except on lands at high risk to erosion, which should be held for watershed protection. District forest officers are responsible for the proper use and management of these forests. However, no serious attempt is made to carry out such work. As a result, national forests are heavily exploited, hacked, grazed, poached, and misused.

2. **Community forests:** These forests were traditionally protected and used by the local villagers and are now in the process of formally being handed over to users groups for effective management. Many of these forests are fragmented amid villages and settlements. They play an economically and environmentally important role in the well-being of villages. HMG has placed special emphasis on the use and management of these forests.
3. **Private forests:** These forests constitute only a small proportion of forestland in Nepal. They consist of small woodlots and trees within farm and other privately owned lands.
4. **Leasehold forests:** Since the passage of the National Forestry Plan of 1976, the government has indicated that it might be willing to let parts of the national forests lease private individuals and firms for economic and environmental reasons. The enabling legislation has not yet been drawn up, however, as there are virtually no, leasehold forests in Nepal.
5. **Special forests:** Some of Nepal's forests are dedicated to special purposes, such as national parks, wildlife reserves, conservation areas, and temple forests. There are no parks or reserves in the Rapti Zone.

**COMMUNITY INVOLVEMENT.** Community forests are managed by FUGs formally recognized by the DFO. There are 355 such groups the Rapti Zone. In addition, there are an unknown number of FUGs that have not been formally identified. Forestry pioneered the user group concept, which has now been adopted by other sectors.

Field visits to a sample of community forests clearly indicated that user groups are motivated to protect forests as well as use forest products to meet their needs. In general, all households within a village or ward can join a FUG. Women are usually included among the members of the FUG, and in a few cases a woman is its chairman (as in Bhabani community forests, Bagar, Dang). The chairperson and committee members are jointly responsible for the proper use and management of their community forests.

**Rapti Zone's FUGs have been established in two ways:**

- 1. DFOs working with forest rangers but with little input from the community would identify potential user groups. A meeting would then be held to inform the groups that a FUG was to be established. A forest management plan would be written by a DFO-designated person.**
- 2. Since 1991, FUGs were formed through meetings seeking input from the community on its felt needs and how it would organize and manage itself. This is the RDP approach.**

**Groups formed by outsiders (for example, DFOs) have had little success in developing leadership. In contrast, the FUGs having a prior history of protection and initiated by local people are surviving. Leadership has played an important and positive role in the effectiveness of FUGs. Where leadership is good and has the community behind it, forests are generally in good condition. Strong groups have a clear vision of how forest resources should be used.**

**The larger the user group, however, the more difficult it is to resolve problems. Formal FUGs are made up of anywhere from 9 to 67 committee members, each of whom answer to 36-175, users. As a result, decisions are made by informal discussion rather than quorum consensus.**

**Most FUGs do not understand their rights to harvest trees and other forest products. They have a sense of ownership but fail to exercise total responsibility for, and management of, the entire forest under their control. In many cases, they have employed one or two protection guards from FUG income. They have also enforced a system of penalties and fines on members for illegal practices.**

**FUG members are likely to belong to more than one user group if their concerns extend to agriculture, livestock, irrigation, or other areas. Although this practice tends to promote self-interest, it also carries new ideas across disciplines. User groups are volunteers. They can do certain things, but they cannot do everything. In particular, they need to be taught how to prioritize their time and finances.**

**Certainly, the forestry advances thus far could not have been made without the FUGs characteristic openness. As a result, these groups work well with DFOs, DSCO, and forestry team members' TA officers. The staff of the natural resource line agencies are graduates of the Institute of Forestry. This professional forestry institution is supported by USAID. Institute of Forestry graduates interviewed for this assessment had a strong commitment to working with local people.**

**DFOs and DSCOs have a leadership role in helping FUGs accept responsibility. DFOs have been allocating an increasing share of their budget and time to handing over community forests to local groups. However, the budget received does not fully reflect how time is actually spent. DFOs are directed to spend 30 percent of their time on community forestry and 70 percent on administration and national forest protection. In actual fact, they spend 70 percent of their time on community activities and 30 percent on national forest administration. As pointed out in the Devres/New Era report, "Forest**

**User Group Effectiveness: Case Studies from Rapti,"** forest product needs are most often met from open-access national forests, which government foresters have less and less time to monitor. The Rolpa DFO has about 100 FUG requests but lacks the staff and technical resources to approve them more rapidly.

Except for several volunteers from the United States Peace Corps and Netherlands Volunteers, there are no NGOs active in forestry in Rapti. The volunteers have been most effective, particularly in working with women and helping them form FUGs.

Although FUGs have been given the "right to manage" forests, they do not own the land. As already mentioned, land ownership is retained by the state. Therefore, in reality the right to manage community forests remains with the government. Thus far, this policy has not jeopardized the establishment of community forests. It will undoubtedly become an issue in 5-10 years, or as soon as protected stands reach harvesting size and FUGs begin to market timber. The forests now being managed by FUGs represent a highly significant economic asset. Through their sales of forest products such as grass, thatch, firewood, and some timber, all FUGs have built sizable bank accounts, which in one case has reached Rs 215,000 (US\$4,300). The users who have formed groups to manage/operate these stands will (and should) expect to take over complete administration, including ownership.

Some reports indicate that much more forest is being degraded than in the past. As a rule, secondary and tertiary users are prohibited from gathering FUG wood, although a few groups charge or provide limited free use for hardship cases. Because of this restriction on what was once a traditional use, such users have shifted their attention to national forests.

Land obviously needs to be demarcated to prove legal ownership, as demonstrated by the following four examples:

1. A dispute has risen between the FUG of the Reugha Ward Community Forest and adjacent private landowner who owns a strip of land that was planted to trees by the DOF. The FUG claims ownership precisely because the trees were planted by the DOF. The private owner contends he never gave up ownership, and that the trees were planted as a recommended conservation measure.
2. The water source for a storage tank in the Khumal subwatershed is on what is considered private land. The storage helps irrigate land owned by 35 farmers. There was a suggestion that the source should be turned over to an FUG, even though no disagreement has yet arisen over it.
3. Rolpa district, has 94,000 hectares of forestland of which 84,600 hectares are considered accessible. Accessibility is a criterion for community forest designation. However, there areas have many high-risk slopes on which the government should maintain a permanent forest for watershed protection. A general rule is that at least 30-40 percent of a watershed should be under forest cover. In Rapti district, however as elsewhere in the country, national forests are not identifiable in the way that community forests are.

4. The 306 hectares of community forest at Baghmare is surrounded on three sides by more than 1,200 hectares of national forests. The national forest is subject to illicit exploitation and degradation. These two forests should be managed and protected under similar programs.

"Improved management" is the term used to indicate that a FUG has assumed responsibility for managing a community forest. The eventual goal is to carry out intensive management, which refers to the sustainable harvesting of products from each community forest. Existing management is passive. FUG forests are commonly under protective management with an option to harvest the yearly growth of grasses or thatch and fallen branches or dead trees for fuel and the planting of seedlings. This level of management is suitable for the Rapti Zone's degraded forests.

Before a forest is handed over to a user group, management agreements or operational plans need to be prepared by the FUG, with the assistance of the DFO. These documents define the forest area, specify how it is to be managed, and outline the activities to be permitted there. Plan preparation consists of four interlinking and overlapping steps: investigation, negotiation, implementation, and review revision. Devres/New Era has compiled instructions for conducting a workshop on how to prepare a community forest operational plan. This has strengthened the extension efforts of the DFOs and DSCOs in management plan preparation and greatly contributed to the high turnover of control to FUGs. Over 600 FUGs have submitted formate requests, and 355 have succeeded in gaining control of forestland. In 1987/88 alone, there were 23 requests, with 22 takeovers.

The national objective under the Forestry Master Plan is to have 350 FUGs per district. The RDP has certainly kept pace with that objective.

The management plan workshop process has successfully established a model for management planning that can be nationally adopted. A standard extension kit on the process has been field-tested and is used by every DFO and DSCO ranger; 239 have been trained in the process. It is a prime reason for the high proportion of forest handovers.

A typical management plan includes the following components: FUG members and committee; a map of blocks; background information; previous management system; forest type and status; objective of the plan; FUG information; nature of compartments; recommended forest operations, presented by blocks; role of FUG and committee; supporting role of line agencies; sales and distribution; rules and regulations; tables on characteristics, products, time frames, and protection.

Missing from the management plan is information on the annual allowable cut, since few details are available on the present growing stock and annual increment per hectare for individual species. Advice to the FUGs on what is a "sustainable" harvest is therefore only a guess. Because grass is produced yearly and is carefully monitored by the people, it is not as important to acquire data on yearly production in this case. With all FUG forests under protection, overcutting has not yet become a problem. As stands mature, however, cutting could accelerate beyond their growth potential.

Plans are prepared for five-year time horizons. Plans are expected to be renewed and updated every five years. A plan may not be renewed if, in the opinion of the DFO, management has been detrimental to the stated objectives. In the case of the Patre Phalne subwatershed in Dang Valley, a FUG management plan was prepared one and a half years ago but has not been signed by the DFO, even though the forest has been under FUG protection for three years.

As pointed out in the Devres/New Era report, "Forest User Group Effectiveness: Case Studies from Rapti," FUGs are not in general following their management plans. It is said that plans are not oriented to FUG-required products, that there is ready access to nearby national forests, that the plans do not fit well with traditional practices, and that they lack details on harvesting and management techniques.

The RDP has established a number of trial plots in association with FUG forests to demonstrate thinning and pruning systems adaptable to the forest stands and to gather growth data. This information will be of great help to the FUGs and line forestry officers. The data should begin to have an impact on management in the next three to five years, at which time many of the stands will be ready for thinning or harvesting.

Except in the case of the mixed terai hardwoods (as in the Uchanimbu community forests), demonstration plots in the Sal forests (as in the Bhabani C.F. and the Shyalapani C.F.) are too conservative. These recently established plots, which retained 1,600 to 3,000 trees per hectare in different subplots at the age of 10 years of coppice and/or seedling crop, are much too congested by any silviculture standard. Perhaps at that age experiment plots with about 800 to 1,600 trees per hectare would be more useful to determine optimal wood and nonwood biomass growth, as well as potential annual yields.

The demonstration plots visited at Bhabani and Shyalapani community forests were well marked. The trees are serially numbered to monitor their attrition as well as changes in height and diameter over a period of years or even decades. In order to measure the changes in diameter correctly it is necessary to make a permanent ring mark at 1.3 meters above the ground, also called breast height, and to use that mark as a base for periodic growth measurements. But such ring marks were not made.

Trees in Nepal are treated as individuals rather than a component of a whole stand. People are reluctant to cut an undesirable tree while it is green, in part because of the earlier tradition of not being allowed to cut without official sanction. Also, few understand that removing undesirable enhances the growth of well-formed trees. The demonstration trial plots will help increase their knowledge of silviculture techniques.

Most FUGs appear to understand the long-term nature of growing trees as compared with agricultural crops. Now that they are receiving income from grass, thatch, and firewood harvesting and some thinning, people are not too concerned about actual timber harvesting; although one or two FUGs have been cutting mature timber. For example, the Mebang FUG harvested 250 cubic feet of timber in 1994, and in 1995 it is expecting to harvest 175 cubic feet. The quantity has been reduced because the FUG has moved into a new cutting block, which indicates that it has knowledge about the annual allowable cut. The Baghmare FUG in Dang harvested 5,000 cubic feet of older trees in 1988 and 12,000 cubic feet in 1993. As pointed out above, however, the

management regimes of stands now being protected or in new plantations will become harvest issues in the near term.

The collection of leaf litter from the forest floor is freely allowed. The local people do not seem to realize that leaf litter recycles nutrients within the forest ecosystem. The combined effect of the overstocked young stands and the removal of leaf litter from the forest floor, especially in the Sal forests, has been to discourage the healthy growth of the understorey herbs and shrubs, as well as to promote surface erosion.

It is felt that more heavier and optimal thinning of young Sal stands would not only encourage the growth of grass and shrubs in the understorey but would boost the annual growth and yields of forest products, including timber, fuelwood, fodder, and grass.

The rotation age for Sal is 70 years; for Chirpine at low to middle elevations it is 50 years; and for Eucalyptus it is 15 years. It is assumed that a 70-year-old Sal stand could have 150 meters cubed of growing stock per hectare. The growing stock and annual increment will vary by site class, which varies greatly in the hill-mountain-valley topography complex of the Rapti Zone. This underscores the need for (1) the existing trial plots, (2) establishment of additional plots, and (3) assistance from research in assessing the data and helping to develop silvicultural guidelines. Growth and yield data are vital in determining how much wood can actually be removed yearly from each of the FUG forests, whether they are 10 or 500 hectares in size. This kind of data is basic to a management plan and essential to preventing overcutting and a forest degradation.

All the FUGs visited have established plantations on land without trees within the boundaries of the forest handed over to them. To date, 4,091 hectares of community plantations have been established by the DFOs in association with the FUGs. In addition, on eroded land, 1,800 hectares the DSCO has planted over 3.5 million seedlings were distributed for establishing plantations or for private use. These seedlings came from the 88 private and several government nurseries set up to accelerate the reforestation program. It is estimated that 10 percent of forest regeneration is assisted by artificial planting. However, this planting often takes place on the most eroded land of the FUG forest, which needs to have vegetation built up rapidly.

Devres/New Era has published guidelines on community plantation planning for use in training FUG people, forest guards, and nursery managers. As a result, the quality of seedling production and private and FUG planting has improved each year. This guide should be made available throughout Nepal.

Sal and Chirpine are the two most commonly used species in establishing plantation. Sal is planted at the lower elevations and pine at elevations above 1,400 meters. Chirpine has been more successful because it can adapt to many sites. Lucenca (Ipil-Ipil) and Eucalyptus species have also been planted, primarily on private lands.

Natural seeding and coppicing are the preferred method of regeneration. With adequate protection, seedlings appear within one to two years. Throughout its field visit, the team observed satisfactory seedling production in most FUG forests; again this supports the not yet fully recognized value of establishing community forests and the importance of continuing the practice.

Up to now the primary purpose of establishing community forests in the Rapti region has been to protect of the land. There is no question that this activity is contributing to the economic welfare of the people and supporting environmental recovery. This kind of passive management is a critical step in bringing degraded lands to a steady, and sustainable state condition. The next step is to move to intensive management, which means setting up links between protection and harvesting. Many of the FUGs are ready for this transition.

Protection has been measured in terms of forage collected, firewood available, timber harvested, and time saved in collecting forest produce. However, there are other forest ecosystem values that have not been measured: namely, wildlife that has returned, erosion prevented, clear water made available, support to agriculture, and beautiful scenery made more beautiful. The FUGs and others must be made aware of this value-added contribution to protection.

The harvesting of trees and the movement of timber to the marketplace have not been great. Except for small quantities, as in Baghmare, the harvested timber has been absorbed locally and sales to outsider has been limited. This is understandable under the management regime described above. Little effort has been put into harvesting techniques. Cutting is still carried out by traditional methods using axes and hand saws. Secondary manufacturing into lumber relies on pit saws, except at one or two powered sawmills in Dang district.

The Bishnupur community forest FUG, Baghmare, Dang, has prepared a plan for installing powered sawmills. They have wood that has been sitting in a storage yard for the past two to three years. However, the transport of sawtimber must be approved by the DFO, which has not taken action, and must be registered by the Department of Small Industry. It is assumed that policy for sawmill establishment must be included within the forestry bylaws now before the legislature.

The introduction of mechanized equipment for logging and manufacturing is a companion step required to bring FUG forests under intensive management. The use of chain saws, pruning and good sawmills will (1) reduce waste from cutting with axes; (2) reduce the time spent in harvesting and manufacturing, thus allowing farmers to spend more time tending to crops; (3) provide additional jobs; and (4) produce a high-quality forest product at lower costs. Such mechanization would not contribute to overcutting since the management plan would keep track of how stands are harvested.

One objective of Phase II is to increase private sector involvement. In forestry this was done by supporting the establishment of nearly 90 private nurseries. These nurseries give more than 1.8 million seedlings to DFOs for distribution to FUGs. In addition, CARE purchased 250,000 seedlings from 14 private nurseries.

The midterm (1990) evaluation recommended that the RDP encourage and support private nurseries, and that they focus on fodder and fuelwood species. These steps have been taken since then and should continue to receive support until private nurseries have become more established business. Some nurseries can be expected to go out of business. The more efficient ones will remain. The Devres/New Era guidelines on community plantation planning can be of great help to private nurseries.

With few exceptions, the FUG forests are producing forage as a result of protection management. The exceptions are those that were placed under FUG management only in the last year or so and in which the vegetation is not ready for harvesting. Vegetation recovers rapidly when it is protected from uncontrolled grazing, fire and excessive grass/litter collection. Protected sites show both grass sprouts and tree seedlings returning in one to three years.

As pointed out in the livestock section, FUGs have planted style (a rapid-growing and spreading leguminous grass), desmodium, and other forage species. Several have introduced them as an agroforestry practice between rows of Sal and Sisoo plantings. Style seed from the Patre Phalne subwatershed, Dang, supplies 75 percent of the Rapti Zone's need and is also sold to distributors in all 75 districts. One hectare produced 40-50 kilograms of style that sold for Rs 8,000 (US\$3.20 to 4.00 per kilogram; others reported selling the seed for US\$5.00 to 6.00).

Forage gathering is regulated and varies from FUG to FUG. At Patre Phalne, 125 households can collect grass for two to three months per year at a minimal cost, and one bundle of thatch can be obtained for Rs 2.0 (US\$0.4). The Punyakhola Community Forest, Bijuwar, Pyuthan, has established the following forage management procedure:

- Thatch grass—Each household can collect over a five-day period for Rs 20 (US\$0.60).
- Grass—Can collect from July through September at no charge.
- Fodder—Can collect for 15 days during winter months at no charge.

The establishment of over 27,000 hectares of community forests has (1) contributed greatly to the production of forage available for FUG participant consumption, (2) reduced the time spent on forage collection, (3) helped protect the land against soil erosion, and (4) improved the hydrologic system within the watersheds.

To date, the marketing of wood and wood products and the role of private enterprise have not received the attention they deserve. FUGs have tended to be conservative in deriving higher yields of fuelwood and poles from the Sal forests mainly because of severe exploitation and destruction in the past. Consequently, young plantations or natural Sal stands, including coppice-regenerated pole crops, are overcrowded, as can be seen in Bhabani, Shyalapani, and other community forests.

At present, FUGs are distributing only a small quantity of fuelwood to member households, usually between one and two backloads of fuelwood per month for each household. This amount barely meets 25 percent of their fuel needs. They obtain the rest by burning agricultural residues, and cow dung, or by collecting from nearby national forests.

Various harvesting practices are used to distribute of fuelwood equitably to each household. In some cases fuelwood is jointly harvested and divided equally among participating members. This was found appropriate for coppicing and thinning carried out over 5 hectares (out of 44 hectares) of the Bhabani community forests. In the same community forest, however, member households were allowed to collect one to two backloads of fuelwood whenever they require it.

Other user groups have adopted other modes of harvesting and distributing fuelwood by some allow members to do so only during certain seasons, or certain days of the month. Others vary the quantity distributed from place to place or from one community forest to another.

In the same vein, prices charged to, or contributed by, user group members vary greatly for fuelwood and grass. Usually, the price is conservative, in the range of Rs 1-5 for a backload of fuelwood. In some cases, the household contributes a fixed amount on a monthly or yearly basis; others pay when they take away the material.

Similarly, the charges for thatching and fodder grasses may be paid in a lump sum on per backload. However, leaf litter can be collected free of cost.

Usually, part of the income from the sale of community forestry products is used to hire one or two forest guards, who are paid a modest salary of about Rs 500 to Rs 1,000 per month. In some cases, if the forest income is inadequate member households may contribute something in kind, for example 1-2 kilograms of grains. This was the "Mana-Pathi" system of paying forest guards for protecting traditional community forests.

In certain areas, the income from community forests may be large, as in Baghmare. Because the trees at Baghmare are large and overmature trees, the FUG there harvested some 5,000 cubic feet of Sal logs in 1989 and another 12,000 cubic feet in 1992. The 306 hectares of community forest at Baghmare seem able to yield 15,000-25,000 cubic feet per year on a sustained basis. The felled timber was sold to the local villagers for Rs 60 and Rs 50 per cubic feet for grade A and Grade B respectively and to outside people for Rs 280 and Rs 265 to outside people. In spite of the large income from these sales, the FUG suffered a loss in contractual logging and transportation. After that, the DOF did not authorize the FUG to make another commercial operation. More important this community forest adjoins 1,200 hectares or more of national forest, which can also produce many millions of rupees worth of timber and other forest products annually.

The above examples show that FUGs which are formed among the related villages or wards rather than as the formal institution of a VDC are more effective in the use and management of local forest resource in Rapti Zone. These are more democratic too in the sense of bearing burden as well as in sharing benefits. Hopefully, the forestry bylaws which are awaiting governmental approval will induce the above aspects of the community forestry program in Nepal.

The 1995 National Forestry Plan is reported to be commercially oriented and the bylaws now before the legislature are supposed to provide specific direction on timber marketing and pricing.

To help strengthen staff development and respond to local needs, the project developed the FACT module for forest managers. FACT contains lessons on government policy and programs, methods of mobilizing forest user groups, community forestry, the preparation of management plans, effective communication, and motivation. FACT has been adopted, and 239 rangers and assistant rangers have received training. Better support has been forthcoming at all staff levels. FACT is suitable for all of Nepal. DFOs

are now conducting training themselves, not only community groups but also among private individuals.

Forest guards are the grass roots workers of the forestry program. They also require education to help them understand programs, policy, and communications. A modified FACT was developed for this purpose, and a total of 421 forest guards have received the training. Those guards have more effective and efficient interaction with user groups, whose demand for community forestry has increased as a result.

The democratic government established in 1990 and Forest Act 2050 provided the policy that has allowed the RDP to practice community forestry and set up FUGs throughout the Rapti Zone. These accomplishments are now having an effect on the new national policy before the legislature. Although we have not seen the legislation itself, we understand that the bylaws are based in great part on RDP experiences.

The bylaws are expected to clearly distinguish between the categories of forests: community forests, national forests, leasehold forests, private forests, and special forests. Further, the new policy is expected to provide more concrete direction on procedures for actually turning over land on which the FUGs forests occur. Although Forest Act 2050 appears explicit on the handover of community forests, no land has actually changed hands. Also, there is no clear-cut understanding of how income from forest products will be distributed. Up to now the income from grass cutting, thatch harvesting, fuelwood collection, and limited timber cutting has been relatively poor, as compared with the amounts that could (and no doubt will) be coming in over the next 5-10 years, when stands now under protection are ready for harvest.

No doubt the future direction of the RDP will be influenced by the forthcoming policies it has helped to promote. The pioneering work of the RDP has not only promoted organizational stability but also helped people who use the products sustain their resources. This work now needs to be expanded through the development of other policies on matters such as management planning, forest category demarcation, and wood product marketing.

Clearly, the roads constructed under Phases I and II have helped accelerate the establishment of community forests. They have allowed the TA Team and line agencies to communicate with FUGs and district communities more readily. FUGs are not concentrated along the road system, but access to their establishment has been made easier.

Basic roads have been built through rugged mountain terrain, over steep slopes and on soils that vary in depth and the extent of erosion. The roads connecting to Khalanga and Libang are normally shut down for 6-7 months at a time because of landslides triggered by monsoon rains. Even now, during the dry season, cuts through steep slopes must be cleared of soil and rock eroding from up-slope. The section of the road approaching Devasthan is particularly vulnerable to collapse as it cuts through a complex geologic structure.

Road closure will have an effect on future forestry developments. As forest stands mature and secondary manufacturing takes place products, will have to be transported to other than local markets. Now that a basic road system has been put in place, the people are expecting that it will be sufficiently upgraded to function all year.

**CONTRIBUTION TO PRODUCTIVITY.** After observing sites in the field, talking with local FUG members, and meeting with zonal and district committee leaders, the project TA team, national headquarters staff, and line agency field staff, we can only conclude that the RDP contribution to the development of Nepal's forests and natural resources has met the goals identified in 1979-80. The following comments are typical:

- "The living standards of the people have improved."
- "Focus on forestry and natural resources has been uniform throughout the project."
- "There is no question that USAID support has played a key role in community forestry."
- "The skills to perpetuate the Rapti are there."
- "Rapti has brightened up a lot of the area."
- "People in other areas are not as aware as we are."
- "People now think the forest is theirs."

Following are several examples of what this contribution has meant.

- There has been a positive approach in the way complex bureaucratic administration has changed to support the establishment of over 27,000 hectares of community forests.
- About 4,000,000 tree seedlings have been distributed over the past seven years.
- Devres/New Era has produced a series of guidelines on management, plantation development, and communications that have not only been adopted throughout Rapti but are circulated nationally.
- RDP has influenced the development of the forest bylaws now before the legislature.
- Women are actively involved in forestry. They participate both as members and committee staff. Several FUGs are solely managed by women.
- The income generated from the sale of products from FUG community forests is being used to pay forest guards. This has allowed the DFOs to put money into supporting those villages without a community forest.
- An infrastructure foundation has been established.
- Under the RDP, 326 management plans have been prepared.
- There are now 523 forestry user groups throughout Rapti.
- At total of 239 rangers, 421 guards, and over 1,400 forest users have received specific education on project planning, rights and privileges, communications, forest management, and other similar subjects.

In sum, forestry has helped to increase the environmental, economic, and social productivity of Rapti. The following are but two examples of what it means to Nepal to have gone through 15-20 years of forest development and the establishment of community forests.

In 1991/92 a 160 hectare nimbukhuti community forest in Dang was handed over to an the FUG formed in 1990/91. This group represents 51 households, or about 330 people. Their activities include nursery management, plantation establishment, protection, forage development, and plantation maintenance. They have a nursery capable of producing 50,000 plants. They have planted forage-producing trees and grasses (style and molasses) in mixture with the 15-hectare plantation and recovering natural forest Rs 75,000 (US \$1,500) from the sale of grasses, firewood, and timber has been deposited in the bank. The group has been selling 200--300 cubic feet of timber per year. Two watchers receive Rs 700 (US\$14) per month.

The FUG has now reached a point where it could use technical support for management and product marketing, as well as assistance in planting barren land to suitable species. Users understand that gully erosion is, but not surface erosion.

The second example is of a Mebang community forest. The Rolpa group manages a 121-hectare forest formed in 1992 and took over management in 1993, when the management plan was approved by the DFO. There are 130 households involved. A 13-member committee of 9 males and 2 females (there are two vacancies) oversees household activities. There is Rs 23,275 (US\$465) in the bank, obtained from the sale of firewood, thatch grass, forage, timber, and fines for illegal entry. The income has been used to purchase office supplies and pay watchers (Rs 500 or US\$10 per month). The forest is divided into compartments from which users harvest wood. These users have a number of concerns:

1. One question pertains to land demarcation. Private land was included within the forest boundary when it was established. These lands should have been excluded, but a new application has to be made to the DFO.
2. Users have not been trained in forestry. Only one person has been trained.
3. They do not know what to do with money in the bank. They lack confidence in making a decision on what to do and are unsure of legalities.
4. They want to divide the forest into two units, that is, two FUG's. They feel one is too large for them to adequately manage.
5. They do not understand the management plan, that is, the contract.
6. They feel "they can pay for their own staff" and "do not need ranger."

**SUSTAINABILITY.** The question facing the groups now is how to build on their well-constructed foundation and turn their attention to management and marketing. USAID support has served as a driving force that has helped the RDP succeed. Rapti Zone forestry can serve as a model for the entire country.

To echo the April 1994 "Assessment of USAID Environmental Programs: Forestry and the Environment, Nepal Case Study, we have also found that "despite the apparent take-off of the community forestry model in Nepal, its sustainability is subject to continued progress in the evolution of policy and institutions." The infrastructure formed 16 years ago is capable of continuing on. The line agency staffs have been well versed in the need for community participation. The people will not allow themselves to return to the time when they were "locked" out of the forest. Fortifying this view is the

excellent education in forestry and natural resources being offered by the USAID-supported Institute of Forestry.

Forestry's institutional capacity has clearly been strengthened under the RDP. Administrations and users alike have the know-how to continue functioning at the present level. Furthermore, the base for managing the Rapti Zone's natural resources base has been enhanced by the establishment of community forestry. And, the production of forest products has increased. However, policy changes required to transform forestry have only been in place for four years. It is essential for the bylaws now under consideration to put additional teeth into management authority.

It is reasonable to expect the government to be compensated for its management and administration support. Likewise, the national forests should be expected to return a portion of the money received from the sale of wood products to local communities, to be used for local development. In the United States, for example, the national forests turn over 25 percent of their receipts to local governments. A similar procedure is followed in other countries.

The skills needed to perpetuate the Rapti program exist. However, it remains activity oriented. That is, the emphasis is still on community forests, training, and establishing nurseries. Lacking is a clear understanding of the relationship between the community forest, national forest, and private forest ownership. Nor is there adequate understanding of actual tree growth patterns, what the forest is capable of producing, or how to manufacture and market wood products that will enter the economy in the next few years.

### **Soil Conservation**

During the project design of RDP in 1987, soil and water conservation was identified as a major concern for the management of renewable resource. After the 1990 midterm evaluation, the project attached greater importance to this component.

Because of Nepal's geographical extremes, soil and water conservation is indeed a formidable challenge for its citizens. Land stability problems in the tropical and subtropical terai and the Siwalik Valleys are radically different from those of the temperate Middle and High Mountain regions. Soil and water conservation activities within a given physiographic region should also be closely related to agroecological zonation, landform, land-use pattern, not to mention the regime's social, economic, and cultural characteristics.

Dang district has severe erosional problems on either side of both the Dang and the Deukhuri valleys. In both cases, the valley bottoms have various erosional problems, such as flash-floods, river bank erosion, deposition of sediment, and rising river beds. In Pyuthan, Rolpa, and Salyan districts, the problems are mainly severe surface erosion from unprotected farm, degraded forests, and denuded grazing lands. Severe rilling and gulling also occur in the poorly managed farms, in the overgrazed and degraded forests, along the trails, and in newly cut roadsides wherever the disposal of rainwater is not properly managed. The Rukum district in the High Mountain region, for example, has

to contend with severe landslides and mass wasting in addition to the usual surface and gully erosion.

The soil and water conservation program in the five districts of the Rapti Zone is carried out at the district level by the DSCO. According to the latest RDP reports, soil and water conservation efforts have produced a number of results:

- Conservation plantation has led to the reclamation of 1,750 hectares of degraded land.
- About 300,000 seedlings have been distributed for private planting.
- Farm productivity has been increased through mulching, terrace improvement, green manuring, and other such measures.
- The project has promoted low-cost bioengineering methods, such as bamboo check dams and bamboo spurs.
- Some 16,000 cubic meters of gabion wire has been distributed to farmers in order to protect 58 gullies, 24 water sources, 23 canals, and 6 kilometers of road stabilization and 49 road slides.
- Thirty-five hectares of forest/conservation plantations have been handed over to conservation user groups (CUGs).
- The formation of 150 other CUGs has been encouraged.
- The publicity and coordination of soil conservation have increased at district and village levels.

Soil and water conservation efforts observed in the Rapti Zone are briefly outlined below:

*Perini-Narayanpur area:* This part of the Dang district has been one of the RDP's outstanding achievements. The watershed, especially the lower part of it, is situated in the Dun (depositional basin) Valley of Dang district where Tertiary shale and conglomerate underlie the Quaternary alluvium. The overexploitation of the forests, followed by the immigration of people from Salyan and Rolpa districts after the Malaria Eradication Programme of 1957, had converted this subwatershed into a desertlike wasteland. Overgrazing, hacking of poles and shrubs for temporary dams, and the overexploitation of the forests for fuelwood, fodder, and timber had led to the gradual demise of the watershed. As springs and wells dried up, human life in the Perini-Narayanpur area deteriorated.

Using the departmental budget and hired laborers, the DSCO started a modest soil conservation effort in 1987 with a small nursery and plantation on 16 hectares. On seeing the successful establishment of the planted trees and, more important, the copious regeneration and growth of the grass under their watchful protection, the villagers became interested in harvesting the grass. The Dang DSCO used this opportunity to organize them into a conservation user group for the right to harvest the grass. In 1990, the local CUG took over the responsibility of planting more trees and grasses over the expanded area of 650 hectares. Experimentation with agroforestry practices was adopted according to the needs of the villagers themselves. In the meantime, gabion check dams

replaced the traditional temporary log dams for irrigation. At present, CARE/N, with RDP support, is constructing a reinforced concrete headwork at Uivarla stream at a cost of Rs 1.2 million for irrigating 160 hectares belonging to 125 households, for which the villagers contributed Rs 750,000 in cash.

At present, most of the soil conservation activities are carried out by the people themselves, with matching support of 50-75 percent from the DSCO. In addition, 650 hectares of the lower part of the subwatershed commanded by the Perini stream have been expanded to the Patre-Phalne watershed of 2,500 hectares that covers parts of four VDCs, which harbor more than 900 families. The main CUG has formed two subcommittees (forest and irrigation), one youth club, and one women's group. Many families have started planting trees and grasses, including fodder species like style (*Stylosanthes guanensis*), on their private land. The local households have also enhanced their farm, forage, and forest incomes. At many locations, eroded land and gullies are stabilized, siltation checked, and the groundwater raised. Consequently, a few fish ponds are being established. In the meantime the local villagers and user groups will be able to learn different aspects of soil conservation and natural resource management through practice, by participating in workshops and study tours in and out of the Rapti Zone. Perini has become a source of inspiration not only for the people of Dang and other districts in the Rapti Zone but also for people in and out of Nepal.

*Kapurkot area subwatershed:* The subwatershed area included by the soil conservation works at and around Kapurkot is located in the Middle Mountain region and covers about 2,500 hectares, with 175 households in the upper catchment of Patu Khola in Lamidanda, Pakhapani, Kapurkot, and Kimichour villages. So far, 46 hectares have been planted with pine and broad-leaved trees and 8 hectares in grasses, including the exotic Napier grass (*Pennisetum purpureum*). The local people are receiving benefits from the native and planted grasses, but not yet from the trees, except for some lopping and pruning. Furthermore, one landslide has been stabilized and the soil loss from the subwatershed has been reduced to some extent. To date, Rs 116,000 has been spent and Rs 10,000 raised from the sale of forage and grass. The CUG has allocated this income to the local middle school.

*Mulpani micro watershed:* Ninety-six households of Mulpani and Jampani villages have taken up a small microwatershed of about 200 hectares (a part of the Hola Khola subwatershed), where 5 hectares are planted with trees and 2 hectares with grasses. The group has controlled two gullies, protected the water source, and distributed fruit trees for planting to individual farmers. With the aid of a sprinkle irrigation subsidy from SFDP of ADBN and DDC, it has also helped three families initiate vegetable farming, who were able to earn Rs 30,000 from 0.6 hectares of vegetable cultivation.

*Soil conservation in forestland:* As described in the forestry section, the RDP succeeded in converting a considerable proportion of the national forests into community ones, including several plantation forests. Local farmers collect needles and leaf litter from pine and broad-leaved forests, respectively. They use this material for cattle bedding and for compost. This one-way transfer of energy and nutrients from forests to farmlands must be reduced to a minimum, if not stopped, for the sake of the health of natural and plantation forests.

***Soil conservation in upland farms:*** Soil conservation is important for the sustained use of the upland (bari) farmland in the hills and mountains of Nepal. The loss of soil and nutrients from the sloping terraces is most severe when these are ploughed to sow maize. Moreover, the maize crop is hoed once or twice in order to aerate the root system and promote nutrient absorption, which comes from compost and farmyard manure applied earlier. In many cases, the RDP farmers have been able to minimize soil and nutrient loss by planting shrubs and grasses along the terrace risers. If undisturbed, natural vegetation appears on the risers and terrace sides when nutrients are trapped there. It is difficult to generalize about the problems and prospects of farmland conservation in the hills and mountains of the Rapti Zone because of the great variety of land forms and farming subsystems there. Nevertheless, there is a strong unified approach to soil and water conservation on farmland. The evaluation team members observed a variety of conservation practices induced by the RDP, such as the planting of Napier grass along the terrace edges; the planting of farm trees for fruit, fodder, and fuelwood; the planting of exotic forage for style (*Stylosanthes*); and the making of farm ponds. The RDP operational plan for soil conservation and watershed management has proposed contour-strip planting, agroforestry, medicinal plants, among other suggestions, but these are not yet implemented adequately.

***Soil conservation on valley farms:*** Dang and Deukhuri valleys in Dang district, as well as a number of smaller hill valleys in the other four districts, constitute prime farmlands because of their potential for high productivity. But these bottomlands are subjected to seasonal floods and drought, sedimentation, and stream bank cutting.

The RDP has helped the local people protect their valuable bottomland farms with bamboo and gabion spurs. However, no amount of spurs will be effective for long if the upper catchment areas of these streams are not effectively protected through proper soil and water conservation measures.

***Specialized soil conservation measures:*** Special steps need to be taken to deal with the following kinds of soil erosion: gullies, landslides, torrents, and river bank damages. The RDP has introduced some methods to control these hazards. Records also indicate that 1,750 hectares of degraded lands were reclaimed by planting; 58 gullies were protected, some through bamboo check dams and others through gabion structures; and a landslide near Kapurkot was stabilized by planting trees and grasses. These are appreciable results in comparison with those achieved in other districts outside Rapti.

***Road and trail stabilization:*** Members of the evaluation team had the occasion to travel over old and new roads constructed with RDP financial support. The road engineers and contractors seem to construct hill roads by hewing the hill slope and throwing the spoil downhill instead of balancing the cut and fill. Consequently, natural vegetation, including trees and shrubs, that could otherwise have stabilized the road, has been killed.

Another factor that increases the risks of erosion is the lack of proper drainage to dispose of excess rainwater collected over the road. Storm runoff under such circumstance also promotes scouring and gulling all along the valley side of the road, making it unstable and unsafe. Similarly, when the hill slope is cut to make the road bed, the uphill slope becomes unstable, and it slides down when not retained by proper breast

walls and/or vegetative measures. The risk of landslides increases greatly when uphill runoff is not diverted to a stable stream.

Trails seems to be a more appropriate means of transportation in remote areas, at least in the beginning. Such trails can be aligned with a view to convert them to motor roads in the future. At the time new trails are made, one or two rows of strong rooting trees and bamboos should be planted downhill to stabilize the slopes.

The team members came across a number of village trails that have become virtual gullies, especially near the villages in areas where human and animal traffic is heavy. This state of affairs is due to a number of factors, including vulnerable geology, fragile and erodible soil, storm runoff gushing through these trails during the rainy season, and the lack of stone pavement as well as drainage along such important sections of village trails.

**TECHNOLOGICAL APPROPRIATENESS.** The technology adopted to deal with soil and water conservation in the Rapti Zone varies, depending on the biological, geological, physical, and socioeconomic conditions. For the most part, the DSCO staff and the local people have adopted appropriate technology to reclaim the degraded land, which has consisted of planting suitable trees, grass, and forage species, as in Perini, Kapurkot, and other places. However, the efficiency and effectiveness of these vegetative measures of erosion control could have been enhanced considerably if the plantings had been carried along the contour instead of in the regular square spacing. Also rainwater could have been collected for the use of the planted trees during the dry season.

An appropriate method of controlling gully erosion at the alluvial terrace of Perini would be to establish a series of live dams from top to bottom, by planting cuttings of suitable trees, bamboo, grass (such as Napier), and shrubs. By contrast, gully control in Salyan (Kapurkot) and other hill districts requires stone check dams with vegetative backups. Bamboo and/or brushwood check dams can check gully erosion provided that enough of these materials are available in the locality.

Measures for controlling stream banks and torrents have been adopted at only a few places, without full effectiveness. These measures should be adopted for the entire length of the stream, which may cross two or many VDCs, or sometimes parts of two districts. In such cases, it is vital for the upper and lower catchment communities to understand the technology to be adopted, as well as the arrangement for sharing the burden and benefit between them for the sake of long-run effectiveness and efficiency. The bamboo and the gabion-wire spurs adopted to control stream banks in valleys represent a move in the right direction, although they need to be backed up by vegetative planting. The torrential streams in the upper catchment will require properly designed engineering structures (based on catchment area, probable intensity and duration of rainstorm and other such factors), in addition to feasible vegetative measures to minimize splash, rill, and gully erosion within the entire upper catchment area. The communities of Narayanpur-Perini in Dang and that of the southwestern Dubring/Dubidanda VDCs of Rolpa will have to work together in order to control the torrential damages of streams in and around Narayanpur.

A landslide is a more dramatic erosion hazard. These events occur on steep slopes when land is disturbed because of inappropriate cultivation, uncontrolled disposal of stormwater, unplanned roads and trails, seismic tremors, and the like. Controlling a landslide is a costly endeavor and therefore should not be attempted unless the corresponding benefits are high, as they would be in saving a habitation, a road, or other costly infrastructure. Above all, the people concerned must recognize that the prevention of a landslide is far preferable to trying to cure it.

**CONTRIBUTION TO PRODUCTIVITY.** In a few pockets in each district of the Rapti Zone, the local people are fully aware that their survival and their prospects for a better livelihood depend heavily on appropriate soil and water conservation measures, both on their land and the subwatershed. The steps taken in Perini-Narayanpur along these lines have been of a pioneering nature. The increased production of native grass after effective protection in 1988, and more recently the production of introduced grasses and forage plants, encouraged the local people to adopt these activities on their own land and to extend the program to 650 hectares in 1990 and to a prospective area of 2,550 hectares at present. These measures have enabled them to produce more wood, grass, and fodder from their individual private holdings as well as the intervening community forests and other lands. In 1994 the community cash income from the sale of style seeds and Napier grass sets (both for propagation elsewhere) alone amounted to Rs 131,000. Similar achievements are also taking place at Tarigaon and Balampur. Because of effective protection and the soil and water conservation measures, the Perini--Narayanpur area has been able to establish a number of fish ponds as well.

Even in the hills, the local FUG at Sejwal Takura in Salyan planted style and a few other grass/forage species under the young pine plantation, to the benefit of the planted trees as well. In contrast to the usual barren underground of pine plantation, the grass planting helps conserve the topsoil and nutrients in the new ecosystem.

Water conservation in the form of farm and stock ponds has contributed significantly to the cultivation of vegetables and fruits over the dry season. In addition, conservation and protection of the sources of drinking water in many places has contributed to the welfare of villagers as well as the people living in the hills and mountains of the Rapti Zone.

**SUSTAINABILITY.** The soil and water conservation program in the Rapti Zone has only a small operational budget of Rs 3 million to 5 million per year. This amount is for five districts. At present, the subsidy given to the various conservation activities ranges from 90 percent in plantation to 75 percent in gully control, to 50 percent in irrigation and terrace improvement. There is no doubt that the subsidy may effectively be reduced in those activities where individuals and communities are able to derive an early and direct benefit from the soil and water conservation works. Planting grasses, fodder, and fast-growing trees, with a minimum of costly engineering structures, will certainly be a good strategy for enhancing the sustainability of soil and water conservation measures.

## **Rural Roads**

The rural road network of Rapti Zone consists of about 430 kilometers of roads at various stages of construction and operation (figure 2-3). It includes 86 kilometers of all-weather paved roads and part of the East-West Highway passing through the southern part of Dang Deukhuri district.

The other roads for vehicular travel are

- Lamahi to Tulsipur (47 kilometers): Graveled road
- Lamahi to Koilabas (34 kilometers): Dirt road
- Bhalubang to Pyuthan (40 kilometers): Dirt road
- Tulsipur to Amelia (25 kilometers): Dirt road
- Tulsipur to Salyan district headquarters (62 kilometers): Fair-weather dirt road
- Ghorahi to Pyuthan district Headquarters (74 kilometers): Fair-weather dirt road
- Chachake to Libang Rolpa district (64 kilometers): Fair-weather dirt road.

Roads were originally begun by the districts under Phase I and implemented by the Department of Roads, which has an office at Ghorahi, Dang. The RDP Phase II supported the maintenance of the 200 kilometers of hill roads constructed and improved under Phase I. Financial support in Phase II was provided on a cost-sharing basis with the government for the repair of road surfaces, slide removal, preventive maintenance, and essential structures. The project is also assisting in the construction of the 29 kilometers section of the Rolpa road from Sulichaur to Libang, in collaboration with the World Food Programme and HMG.

Several other low-cost hill roads were built following the midterm evaluation. Additional improvements included the construction and improvement of the 31 kilometers of the Ghorahi, Dang to Holeri, Rolpa motorable road; the 37 kilometers of the Kapurkot, Salyan to Jinabang, Rolpa mule trail (of which the first 10 kilometers can be made motorable); and the construction of a 100-meter RCC bridge over the Madi River in Rolpa.

The latest status of the RDP road program is as follows :

- Salyan road (62 kilometers): buses and tractors use the road regularly except during the rainy season.
- Rolpa road 64 kilometers: buses ply up to Libang tractors up to Bijuwar (66 kilometers).
- Holeri road, 31 kilometers: road improvement and construction began after 1992/93.
- Kapurkot to Jinabang Trail, 37 kilometers: construction started in 1992/93; it is expected to open up to Jinabang by July 1995. Ten kilometers of the first part of the trail from Kapurkot is expected to be motorable in the dry season.
- Madi Bridge: under construction by the Department of Roads; the contractor is the National Construction Company.

The progress of the Madi Bridge construction, however, is behind schedule because of the late arrival of bridge bearings at the site and a delay in obtaining approval for additional work on the right abutment. Approval has been requested to modify the contract because the geology of the right abutment was not correctly analyzed (but was submitted to the Department of Roads in October 1994). No reply or acknowledgment has been received.

**APPROPRIATENESS OF TECHNOLOGY.** The technology employed for the construction of rural roads is labor-intensive. In fact, Rapti roads have been initiated by the local population, coordinated by elected local groups. With the support of RDP, these roads have been improved and maintained, through the technical assistance of the Department of Roads at Ghorahi, Dang.

It seems that roads have received little attention on a planned basis. Some stabilization activities were occasionally seen during the field visit, but they did not seem to be undertaken on a systematic basis. Since road construction is largely done by employing indigenous technology, appropriate stabilization measures on a planned basis are needed in order to prevent landslides and the erosion affecting farmland along the roads.

**CONTRIBUTION TO PRODUCTIVITY.** The roads in Rapti have provided a broad infrastructural base for the stimulation of the zone's economic sectors, including agriculture, livestock, horticulture, and forestry. Farmer groups, agroentrepreneurs, and local development agents who were met during the field visit mentioned roads as their number one priority. For this reason, the RDP has played a supportive role in meeting the basic infrastructural needs of the farmers and agroentrepreneurs with the opening of roads and subsequent arrival of buses, trucks, and tractors. Farmers have started commercial production of off-season vegetables, tomatoes, potatoes, and beans. The trail from Kapurkot to Jinabang is being built to provide easy market access for the people of Rolpa, particularly the apple and vegetable growers of Jinabang.

Field observations and also the visit to the Department of Roads office at Ghorahi suggest that the Salyan, Pyuthan, and Rolpa dirt roads, although seasonal, have been extensively used for the transportation of goods and services. The annual progress report of RDP 1993/94 indicates that the Salyan road provides for the transportation of Rs 7.8 million worth of ginger, Rs 1.2 million worth of oranges, Rs 2.5 million worth of ghee, and Rs 2.3 million worth of apples from Lanti to Tulsipur, and the commercial production of tomatoes from Kapurkot to Dang. A trader at Lamahi, Dang Deukhuri, reported that Lamahi alone exported over 1,600 metric tons of cereal grains and cash crops to the Kathmandu market in the past season. Such figures give an idea of the contribution that roads can make in linking Rapti farmers to the distant market.

**SUSTAINABILITY.** The RDP support for Rapti rural roads has opened the door to a wide range of opportunities. But attention must also be given to further road improvement as well as maintenance activities, as roads will be needed. The local bodies including user groups are the key element in maintaining roads in the future. Government line agencies should be able to coordinate the technical backstopping that the local bodies are lacking. The farmers and agroentrepreneurs of Rapti have learned that roads, even though they are seasonal and rough, can make a difference in their earnings. The sustainability of rural roads therefore requires the participation of the various users (including the farmers) for maintenance and systematic stabilization, with technical support from the line agency.

## **LOCAL GROUP AND PRIVATE ENTERPRISE CAPACITY**

One of the most important activities of the Rapti project has been the development of a wide range of user groups and the integration of those groups into private enterprise activities. That integration has been dealt with at length in earlier sections. This section focuses on the user group approach. A detailed treatment of forestry user groups is provided in Chapter 2.

### **Horticulture**

In the Rapti Zone, the user group approach has been an effective means of reaching farmers. DADOs have used the group approach mainly in programs concerned with commodities of high value (such as fresh vegetables, vegetable seed, and potatoes). Most of the farmer groups in agriculture are loosely structured groups formed for production purposes. Their marketing is done by individual members. Farmer involvement in agricultural development activities through various groups has made the work of extension workers easier. Farmers are given training and advice through farmers' groups. Farmers' involvement in the production of vegetable seeds and fresh vegetables has been very encouraging.

Local farmer's groups have been effective in enhancing the production of various horticultural products. Farmers are earning good cash income by growing off-season vegetables and vegetable seeds. In some areas, farmer groups have also been active in the repair and maintenance of canals with a view to ensuring the supply of water and seeds. Some groups of farmers in Kapurkot are also involved in marketing seasonal as well as off-season vegetables and ginger. At Barela (Salyan), the vegetable seed production group is providing market services, quality seeds and technical guidance to the farmers. It produced 14 metric tons of seeds.

Jinabang (Rolpa) has an Agriculture Entrepreneur Association, established last year with 13 member farmers. This is the only "marketing" association that deals in vegetable seeds, potato seeds, and apples. Twenty-two farmer-producer groups are associated with this marketing association. In 1994, 70 metric tons of apple and 50

metric tons of vegetable seeds were traded by this marketing association in Jinabang. As a result, this association collected Rs 100,000 from its 4 percent commission, which is being used to build its office.

In Chakri (Rolpa) there are six vegetable producer groups, three of which are female groups dealing mainly in the production of off-season vegetables. A female member of the group earned Rs 35,000 from 0.15 hectare of land. Chakri can be developed following the model of Jinabang.

Many of the local farmers groups are in the initial stages of development. To continue their activities, these farmer groups need further guidance and support from the project. A kind of welfare (group saving) fund should be created, in order to make these groups and their activities sustainable.

## **Livestock**

In the past decade, the farmer groups approach has been the major extension vehicle used by DOAD to develop livestock. Many livestock farmers have been willing to adopt this approach provided they receive the package of services: namely, animal health, production and management training, seeds/seedlings for fodder productivity, easy access to credits, marketing of the products, and a regular flow of technical information. The objective has been to make farmers self-reliant in their basic requirements through measures such as the saving scheme for small credits, livestock insurance, inputs (such as seeds, seedlings, and drugs, basic animal health services and marketing of the products.

During the project period, 204 livestock interest groups were established: 98 for buffalo, 87 for goat, 9 for cattle, 7 for pig, and 3 for poultry. Only 119 groups (58 percent) were found to be active and functional. Among the successful groups, 58 buffalo groups with 1,010 members managed to raise Rs 0.72 in their savings, and they invested Rs 0.27 million (37.5 percent) in the development works. The 48 active goat groups with 992 members collected Rs 0.71 million and invested Rs 0.45 million (63.4 percent) in their socioeconomic development activities. The success of these groups is linked with their interest and choice of species for production, the ease of raising livestock, and easy access to the sale of the products for better economic returns.

The original idea was to establish a model for livestock productivity that was to be tested and applied by 35 groups. The concept of a model farmers group has been modified to focus more attention on production and income generation. Initially, the focus was on farmer group management, with a view to improving their capabilities to implement production and income generation programs. The livestock groups have been slow to adopt new technologies on herd management, feed management, and grazing control, because they are still in the development stage. These technologies cannot be acquired until farmers are able to generate adequate resources on the farm itself, that is, fodder and feeds.

## **Forestry**

The user groups establishment in forestry led to the formation of groups in other areas. Turning over control of accessible forest areas to communities has been effective and is helping to promote sustained management. Whether the FUGs are sustainable will depend on the following factors:

- Support systems focusing on extension and research must be organized in small woodlot operations.
- Support from government line agencies is needed to accelerate the establishment of community forests.
- Wood and wood product utilization, manufacturing, and marketing need to be demonstrated to show FUGs where income opportunities lie.
- Training in management plans and operations must build on traditional technology but should also include the scientific approach to the annual allowable cut potential.

The community forest program is approaching the stage where it can be evaluated. Forest protection is only one factor, but a significant one. Controlled management is allowing forest stands to put out added growth, which was previously being lost to overharvesting and grazing. It is estimated that 6-10 cubic meters of wood a year are now being added per hectare as a result of protection management. With quality Sal roundwood selling at about US\$360 cubic meter, protection is providing a significant standing saving bank account.

Sites in Rapti are showing changes in hydrologic recovery, and erosion is being reduced. Villagers are being motivated to invest in forestry activities. The team noted that forests support many species of bird life, and have helped regenerate water resources. These added values are difficult to quantify but are examples of beneficial side effects of forests emerging throughout the Rapti.

## **Marketing**

The big success in marketing is in the VFC program, in which user groups have been brought into contact with traders, and competition among traders has been encouraged. Livestock marketing has been impeded by the lack of growth in per capita income in Nepal, and forestry marketing has received little emphasis but should be central to the next stage of development.

**HORTICULTURE.** Marketing is an integral part of the VFC program. In the past two years, business linkages have been established between producers and traders as a result of direct contact and business negotiation through market development workshops. This marketing network approach is appropriate in view of the fact that the majority of farmer producers from the rugged hills and mountains are illiterate and quite isolated from the outside world.

About a year ago, a people's marketing association was established in Jinabang to market high-value cash crops with the assistance of the VFC program. This association

is called Krishak Shramjibi Sangha (Agriculture Entrepreneur Association). The Association has 13 members at present. Twenty-two VFC producer groups, mainly in apples and vegetable seeds are associated with this organization. It collects a 4 percent service charge on the total sale proceeds and puts this revenue into welfare (group saving) fund. The association provides information on production technology, market prices, and commercial niches to its 22 producers groups/associations in and around the vicinity of the Jinabang VDC. It also has regular contact with the major market centers such as Butwal, Nepalgunj, Narayanghat, and Kathmandu.

The VFC program has established four periodic markets (*Haat Bazar*) for the purpose of mobilizing local participation. These markets take place at Lanti and Kapurkot in Salyan, Bijuwar in Pyuthan, and Chaurjhari in Rukum. In addition, two collection centers are maintained at Lamahi and Kapurkot. A system of disseminating price information has also been established in these *haat bazar* and collection centers over the past two years.

The RDP has carried out several workshops for exploring market opportunities for farmers dealing in high-value cash crops. The program has sent groups of local farmers and traders to different market centers where they are to establish market linkages by themselves and also to negotiate contracts.

Have the above marketing techniques and technologies helped the Rapti farmers increase their productivity and income? This answer is obvious in the case of vegetable seed production and marketing. The production of vegetable seed in the Rapti rose from only 3 metric tons in 1987/88 to 20 metric tons in 1992/93. Following the first 1993 workshop on developing markets for vegetable seed, vegetable seed production increased to 86 metric tons (equivalent to Rs 5 million) in 1994. As a result of the second vegetable market development workshop in 1994, vegetable seed production is expected to increase to 125 metric tons (equivalent to Rs 8 million) in 1995. Thus, in 1995 Rapti hill farmers should get Rs 8 million from vegetable seed production alone. This is a considerable contribution to the household cash income of the Rapti hill farmers. In its first year, 70 metric tons of apples and 50 metric tons of vegetable seeds were traded by this marketing association. The above figures and table 2-10 show a direct impact on the household cash income level of the Rapti hill farmers.

*Table 2-10. Growth Rates, Commercial Production and Cash Sales, Vegetables, Fruits, and Cash Crops, Rapti Zone, 1989-1993 (percent)*

<i>Crop</i>	<i>Production for sale</i>	<i>Total cash sale</i>	<i>Total households enrolled in the program</i>
Vegetable seed	23	10	11
Fresh vegetable	36	22	13
Fruit sapling	18	21	15
Ginger (dry)	7	13	6

*Source:* Tulachan and Shrestha (1993).

As table 2-10 shows, the highest growth rates achieved in commercial production in 1989-93 were for fresh vegetables (36 percent), followed by vegetable seed (23 percent). The growth rates in total cash sales are not as high as those of commercial production, because the prices fell. The increase in the number of households enrolled in the VFC program is also significant: the annual growth rate surpassed 10 percent.

The team's field visit provided detailed information on the VFC program. The production of apple and vegetable seed is increasing rapidly. Almost all farmers interviewed in Jinabang reported that they would be increasing areas under both apple and vegetable seed production provided they had assured markets. They also said that producing apple and vegetable seed was two to six times more profitable than the production of cereal grain crops. They want gradually to replace cereal crop production with apple, vegetable seeds, off-season vegetables, and other cash crops. When asked where they would obtain foodgrain, the simple answer was that they could easily bring rice and other foodgrains down from the terai with the money they earned from their cash crops sales. This shows that there is a tremendous potential for growing high-value cash crops in the Rapti hills. Farmers in the Rapti hills and mountains will gradually specialize in apple, vegetable seeds, and cash crops, which will lead to strong trade between the hills and the terai. Hill farmers will sell high-value cash crops and the terai farmers will sell foodgrains. The VFC program seems to have benefitted all categories of farmers: rich, medium, and poor.

In Jinabang about 10 years ago, most of the menfolk (at least one or two from each household) used to go to India to work. Now, because of the growth of high-value cash crops, this outmigration has declined by about 75 percent. These workers also feel more prosperous because they can now buy rice and other foods from terai. Children have been healthy and the quality of life seems to have improved. Furthermore they can now afford to send their children to schools. One interesting thing that they told the evaluation team was that about 10 years ago, the people living down in the valley were more prosperous than they were. But the valley people made no change in their lifestyle because they lacked income-generating opportunities. In contrast, the Jinabang people changed their lifestyles considerably because of the opportunities for growing high-value cash crops as a result of the favorable agroclimatic niches.

An all-out effort to market high-value cash crops did not begin until two years ago. These marketing activities have helped to increase the production of both high-value cash crops and household income. Local farmers and traders feel that the project should continue to assist them in marketing activities and agribusiness/enterprises for the next three to five years if they are to stand on their own feet and carry out all the marketing activities on a sustainable basis by themselves. They believe the program has been of immense benefit, but that it needs to be reinforced and further strengthened and expanded.

To sustain these activities, local resource groups like VFC Farmer Master Trainers should be developed and mobilized. At present, about 263 skilled farmer trainers (trained by the VFC program) are available locally to train other farmers in the production techniques of different HVC crops. There is great flexibility in using them. They can be further strengthened and expanded. This is a very cost-effective operation.

Similarly, the Apple Resource Center in Jinabang has become self-reliant in supplying apple seedlings. In addition, a number of private apple nurseries are being developed.

The system of marketing high-value cash crops also needs to be improved and modernized. Currently, most of the hill and mountain areas have a rudimentary and highly inefficient marketing system. In order to solve this marketing problem in the pocket areas of the VFC program, the project has already started establishing periodic markets (haat bazars), collection centers and price information. But a linkage or contact with the Market Development Division in the Department of Agriculture Development is still missing. A linkage must be established with this division. Advice can be sought from the Food and Agricultural Organization marketing experts working in the HMG/Food and Agricultural Organization vegetable and vegetable seed production project at Khumaltar.

Marketing sheds need to be built in collection centers (Kapurkot and Lamahi). In addition, simple rules and regulations need to be formulated for the operation and management of markets, the provision of marketing extension services, construction of appropriate cold storages, and cellar storages (in Jinabang).

Domestic and international alike need to be improved, along with, post harvest technology, processing, packaging, labeling, transportation, storage, and other value adding techniques. Quality control needs to be improved for both vegetable seeds and apples. The government should play a major role in this effort and improve marketing management. This would mean exploring various market opportunities and developing of business plans. Production techniques also need to be improved, particularly in areas such as soil fertility; integrated pest management; the availability of high-quality foundation seed; and the improvement of apple varieties.

NARC can play a critical role in meeting production needs. Therefore, future programs need to link up with NARC on these issues. Since it takes 5 to 10 years to obtain research results, it is also crucial for NARC scientists to visit the project area farmers on their fields, that is, to promote on-farm research. Himachal Pradesh (India) has done excellent work in apple and off-season vegetable production. Thus many ready-made technologies are available in Himachal Pradesh. The future program for HVC crops needs to establish a strong link with research centers, universities, and other production and marketing groups in Himachal Pradesh. Before the turmoil in Jammu and Kashmir (India), several pocket areas in Jammu and Kashmir grew valuable temperate vegetable seeds. A linkage with Jammu and Kashmir government should be explored.

The present concept of developing potential pocket areas for HVC crops through NGOs or private firms has proved to be extremely valuable. Because of its flexibility and less bureaucracy in decisionmaking and implementing the program, no HMG organization can substitute such an organization in its performance. However, it is also important to establish a strong links with HMG's relevant departments and research centers. A mechanism needs to be developed to show how such a linkage can be effectively built with the aid Department of Agriculture Development at the district level as well as the central level, and with other donor organizations that are doing similar work.

The Jinabang HVC crop producers have already established an excellent model for the promotion and development of HVC crops. This model is directly contributing

to increased household cash income in the hills of Nepal. Now, it is vital need to further strengthen and reinforce the Jinabang model. It should be expanded and replicated in other potential pockets of the hills and mountains of Nepal. This is the only way hill and mountain farmers can contribute to the rapid economic growth of Nepal.

**LIVESTOCK.** The marketing of livestock products, especially milk, has been a basic issue in the project areas. Two private dairy enterprises—Shree Ram Dairy Enterprise and Lila Dairy—are handling about 80 liters and 30 liters a day at Tulsipur and Ghorahi, respectively. The Lamai Chilling Center of the Dairy Development Corporation is handling only about 650 liters of milk per day, although the plant has a 5,000-liter capacity. Because of inadequate pasteurization and handling capability at Balaju Dairy, the Lamai Chilling Center had to observe a two-day milk holiday. These two private dairies have received training support through NCBA/ADBN.

The traditional marketing of milk products such as ghee is constrained by the high cost of transportation and the quality of the products. However, there is small market for quality ghee at Dang Valley and Lamai bazaar.

The livestock market for handling unproductive animals at Satbariya (Dang) was not functioning as the animal traders did not take enough interest in it. The proprietor of Lila Dairy is embarking on the supply of buffalo breeding animals at Ghorahi (Dang) in association with ADBN. It is no problem to market goats in the region because middlemen often buy the animals from the villages.

Buffalo raising with an assured milk market has proved to be one of the best enterprises for improving the socioeconomic condition of the farmer. The two private dairies are still in the establishment phase. The scope of expansion of the local dairy is limited as the local consumer population is still small. The Lamai Chilling Center is not likely to handle more milk until the basic issue of the management of the Dairy Development Corporation is solved.

**FORESTRY.** A greater share of stands protectively managed by the FUGs will be ready for harvesting in the short term. It is assumed that each hectare of protected forests is capable of putting out 6-10 cubic meters of wood per year. The value of a cubic meter of quality roundwood is about Rs 18,000 (US\$360). Therefore, the present value of a hectare of forest is increasing at the rate of US\$2,000 to 3,500 per year. The value of one year's increment on the 27,000 plus hectares of community forests at today's price approaches US\$7 million. These figures do not take into account detailed costs and site-growth data, which vary greatly, but they do demonstrate the potential value of the forests now being managed by FUGs. More important, they point out the need to assign high priority to exploring the marketing of wood.

The USAID forestry team now critically exploring future directions in the Rapti is expected to emphasize the marketing issue. Although this report places highest priority on all aspects of marketing, specific details of how to approach it from a forestry point of view must be left up to that forestry team.

## **Extension**

Extension activities are an integral part of all production and marketing aspects of the RDP. The program has had mixed success in integrating its activities with those of DOAD. Nevertheless, the potential for such synergism is great and the impediments to it should be dealt with in further project efforts.

**HORTICULTURE.** The function of extension has been to transfer technology to farmers in order to increase the production and productivity of the farm. The package of technology provided for horticultural crops of different ecological zones has been limited because less emphasis was placed on these crops in the past. A great deal of research still needs to be done in horticulture crops. The guiding principle has been to promote horticultural crops in pocket areas through farmer's participation along the roads. The development of entrepreneurship in the private sector is the other side of the horticultural development strategy.

The development of horticulture has been handicapped by the shortage of competent and experienced horticulturists. This has been a serious problem in the districts of Rapti Zone, but not in the VFC program area. Competent and resident site coordinators are stationed in the pocket areas. Regular training, visit, and workshops are conducted under VFC program. Knowledgeable trainer farmers with outside experience in Himachal Pradesh, India have been mobilized. Simple village-level workshops have been developed and tested in the project area. These workshops have been demonstrating the planning process. The pocket development approach has been successful in the RDP area. The development of private enterprises in the field of high-value cash crops is in its initial stage.

Farmer involvement in the development process is visible in a few areas. The model of developing a pocket area with local people participating in planning as well as implementation can be replicated in other parts of the district.

**LIVESTOCK.** The extension philosophy of the DOAD is to promote new technology to increase farm productivity and production through the farmer group approach so as to increase participation. However, the actual technology package available for different production enterprises and product processing appropriate for different ecological belts and socioeconomic groups is still limited. The management of the dissemination of the technology package in the groups is still not fully developed.

Ideally, knowledgeable farmers should participate in disseminating technology and information through discussions, but this farmer-to-farmer training process has not been widely practiced in the RDP areas. Simple village-level workshops have been developed and tested in the project area. Farmer participation in the planning process has just been introduced in the project areas through the village workshop and the rural planning workshop initiated by the DOAD through the Agricultural Projects Services Center.

The approach of the CRMS has been developed with the use of the village workshop. This has just been introduced in the forest user group to develop their own forest management plans. However, the process of village level workshop and CRMS has not yet been developed to the point where it can be introduced to the livestock groups to increase their participation in the planning process, and thereby improve their capability to implement production, service, or marketing programs.

**SOIL CONSERVATION.** Extension is clearly vital to a soil and water conservation program in a difficult and mountainous zone like Rapti. The RDP has achieved commendable progress in organizing some 150 conservation user groups. Equally important, it is making people aware of the need to protect and manage their respective micro- or subwatersheds and giving them the confidence to do this themselves. During the course of its extension work, the RDP has incorporated a number of subactivities such as study tours, farmer-to-farmer visits, conservation training and education, documentary slide shows, and the distribution of extension material.

### **Women's Involvement**

It had been the policy of HMG to involve women in all aspects of national life. To facilitate such involvement, the MLD created a women's development section, which was later transformed into a fullfledged department of MLD known as the Women Development Department (WDD). The general objective of WDD is to integrate rural women in all development sectors through the implementation of specially targeted programs to meet the needs of women by linking and coordinating such programs with other governmental and nongovernmental organizations. The RDP has supported the effort at the WDD/MLD since 1985. Of particular value to the women's development program in the Rapti Zone has been the support provided by RDP in the areas of training for the women development officers and workers.

The women's development office formulates plans for action and sends the plans to the line agencies with a request to include their needs in line agencies' plans for providing support services. Finalization of such programs is made at a district level meeting of the women development officer with the Local Development Officer (LDO), planning Officer, and the heads of local line agency offices.

Women's activities include conducting adult literacy classes, establishing child care centers, income-generating activities, health and sanitation programs, and community development works such as reforestation and the prevention of soil erosion. The RDP together with various sectoral line agencies supports the women's development effort by providing financial, managerial, and technical assistance, and by including women development workers and members of the women groups in various training programs and workshops.

Among the various types of user groups in the five districts of Rapti Zone, the women's groups could be considered the most purposive. Their groups have been

particularly successful in integrating the services provided by different sectors in the district. They are most active in sectors such as agriculture and livestock raising. In contrast to past practices, the women in these groups are now able to talk to different officials, establish contact with service delivery agencies, and put forward their needs and thereby enhance their interests. However, the women's programs are still limited to the more accessible locations. Nevertheless, they have had a positive impact on women in other areas where programs are not being implemented.

**HORTICULTURE.** Women are active members of user's groups. As a result of the RDP's group approach, credits are made available to women for income-generating activities. These activities have helped women increase their family income and thereby improve their economic status. Women have started taking part in economic activities such as the production of fresh vegetables and vegetable seed. These activities have increased general awareness in women. Their consumption of nutritionally important fruits and vegetables has increased, and literacy programs have helped women understand the importance of kitchen gardening and fruit processing. Women in Chakri village of Budagaon VDC of Rolpa have formed vegetable production groups and have started off-season vegetable production.

Women's participation has been dramatic in several development activities, especially in income-raising activities. Because of the rise in incomes, expenditure on the education of children has increased. Recently, attention has shifted to limiting families to a few children and to ensuring they are well raised. An indirect result of women's participation is that the consumption of nourishing foods like fruits and vegetables has increased. As a consequence, kitchen gardening is becoming more common.

**LIVESTOCK.** The basic policy on the involvement of rural women in different production and training programs has been developed and circulated for the institutionalization of the process by the DOAD. However, only 11-12 percent of the livestock production groups were found to be women's groups although there was some participation in the mixed group as well. The HMG policy of expanding the participation of women in the planning and production programs has not been rigidly applied in the rural extension programs.

Furthermore, more than 60 percent of the credit provided to women through WID programs in the RDP is for raising small animals, but the training of women in the livestock field is allocated no more than 7 percent. In other words, the WID program did not give enough training opportunity to rural women to increase farm/livestock productivity and production in order to improve the status of family nutrition and family income.

The DOAD has limited women field-level extension workers, and they are not adequately trained or mobilized in the extension work focused on rural women.

**FORESTRY.** Women have been instrumental in bringing about the forestry accomplishments described in this report. Not only are women members of FUGs and FUG committees, but several FUGs are entirely composed of women. Women are the main collectors of wood, fodder, and litter, therefore it is only right they should have a major say in how forests are managed. However, the greater percentage of FUGs are controlled by men, with a token membership of women. This attitude is changing, however, now that more and more women are attending literacy classes.

### **Small Farmers' Participation**

Much of the RDP activity is particularly suited to small farmers: horticulture and livestock are labor-intensive; gully erosion control increases the productivity of marginal lands to which small farmers can gain access through user groups; and small farmers rely greatly on the forests for fuel and fodder. Two caveats are in order, however. First, some of the project activities will entail considerable risk until proven effective, and thus it is reasonable for small farmers to lag behind the larger ones. Second, vigilance is needed to ensure that small farmers are fully represented in user groups.

**HORTICULTURE.** Production and income generation programs have been set up for small farmers in horticultural crops. In the Moolpani watershed area (Salyan), sprinkler irrigation has been used by a farmer for the production of vegetable and potato in an area of one ropani with the technical guidance of the ADO office. In an interview with the farmer, it became clear that he thinks he can easily pay back his loan for the sprinkler by growing cauliflower and potato. Cauliflower sold from this plot has been worth Rs 1,100. Leaves are sold to feed rabbits in Kapurkot.

The participation of small farmers in promoting the production of horticultural crops could be increased. Research on low-input technology especially for the interest of the small farmer is hopelessly limited. A technology package has to be prepared by judging the need and capability of small farmers. Their participation in horticultural crops will be sustainable provided they are regularly supervised and properly guided.

**LIVESTOCK.** The DOAD had provided specific instructions to focus production and income generation programs on small farmers, but in fact, this has not materialized adequately in the production of livestock. The needs and capability of the small farmers are still not fully taken into account in the promotion of a technology package for increased productivity and production. Research on low input technology directed toward the small farmers is also severely limited.

More than 60 percent of the credit disbursed to the small farmers through SFDP and ADB in the project has been directed to livestock, but the support in terms of training, extension, the availability of services, and the marketing of products has been severely restricted. As a result, the performance of these groups has often been poor, and they have been difficult to sustain.

**FORESTRY.** Forestry user groups are made up mainly of small farmers from a village who have banded together to manage an area of land set aside for the production of wood. At the same time, most of the farmers grow trees on their own land for personal use. This is done without interfering with agricultural crop production. Compared to the community forest, the farmers' private "forest" includes fast-growing multipurpose trees, such as Melia or Leuceana or fruit trees.

The RDP has had a small agroforestry activity in the Dang-Deukhuri area. The program was set up to investigate the production of agricultural crops with multipurpose trees. The team did not visit sites where the modified Taugya system has been applied, but we observed the technology in other locations. The mixed planting of trees and crops is well accepted by small farmers. The number of trees will depend on the size of the farm. Usually, the smaller the farm the more the trees are concentrated around the farm buildings along bunds. If the farmer is fortunate to have a piece of land that is marginal for crops, the practice is usually to grow a shade-tolerant crop or grass in mixture with the trees. Because small farmers in the hills attempt to grow agricultural crops on every bigha of land, agroforestry as described by the Taugya system is seldom seen except in valley bottoms.

Agroforestry is a traditional practice among most small farmers. The extent to which they can include trees depends on how much land they can devote to them. The establishment of FUGs has been particularly helpful in offering an alternative or supplement to small farmers participation in the planting and growing of trees. However, this should not detract from the project supporting the continuation of planting trees around homesteads and on land suitable for growing agricultural and tree crops together.

## **DISTRICT INSTITUTIONAL DEVELOPMENT**

The permanent institutions in the districts are the representative bodies of the local government. These are the DDC and VDC and the line agencies of the ministries. Apart from these formal institutions, various user groups, NGOs, banks, and women's development offices (under the Women Development Division of the Ministry of Local Development) are found in various places in the district.

The central role in the development activities of the district is played by the local development officer of the Ministry of Local Development, who is also the secretary of the DDC. He is responsible for planning, budgeting, implementing, coordinating, monitoring, and evaluating all local development activities.

Most development activities are carried out with the participation of the target population, organized as user groups and having their own user committee. The line agency staff at the district and subdistrict level deal with their respective user groups to fulfill their development needs.

In accordance with the recommendations of the special evaluation conducted in 1983, the RDP has focused its attention on the development of local institutions. Its strategy has been to help the local institutions become more efficient in performing their

functions. In this respect, it has targeted the local government representatives, the staff of the line agencies, and the members of the user groups.

In order to promote institutional development, the RDP has provided technical and management training to the district offices. The appropriateness and usefulness of such training was confirmed by the staff of the district offices, as well as by the women development officer. The preservice orientations and trainings provided by their respective ministries and departments, it was said, was sufficient to undertake their respective tasks in the district from the outset. However, the training provided by RDP was said to enhance their efficiency.

All such staff interviewed in Dang, Pyuthan, Salyan, and Rolpa were unanimous in their support for maintaining this effort. And those who had not yet received training from RDP were eagerly awaiting their turn. Among the training received by the staff of the district offices, that related to group mobilization and participatory techniques were considered to be most useful as the staff were called upon to deal with user groups. The limitation of the preservice training and orientations provided by the respective ministries and departments was highlighted in that there seems to be no systematic and regular provision for upgrading the efficiency of their staff. This hiatus seems to have been filled by the training provided by RDP.

The training has also been useful in enabling these institutions to keep appropriate data through an inventory of resources and district-level profiles. However, some limitations in this respect were discerned. District offices still needed to develop their capacity to update the profiles and inventories on a regular basis. The timely compilation of periodic data and information is said to be hindered by the fact that formats devised by the RDP and those by the ministries were not uniform. Presentation of the same set of data in different formats was not only confusing but also time consuming. Therefore, there seems to be a need to develop a consensus regarding the use of uniform formats by the ministries and the RDP.

#### **District Development Committee/Village Development Committee**

The representatives of the local government bodies, particularly the chairman and vice chairman, have been involved in workshops to improve their knowledge and skills in planning and administration. These workshops, it is said, have increased their knowledge regarding development administration and have also created an awareness and appreciation of the efforts of the RDP and the line offices.

Newly elected political representatives, the DDC and VDC chairmen, confessed their limitations in operationalizing various development activities. The workshops conducted by RDP had enabled them to overcome some of these limitations. The workshops had also created a forum for exchanging ideas and views with representatives of other districts and thereby enabled them to benefit from each other.

## **User Groups**

The formation of user groups and their involvement in the development process and in the operation and maintenance of various projects have been encouraged by government policy. All line agencies have encouraged the formation of user groups and provide services to the beneficiaries through these democratically formed groups.

The RDP has supported this policy, which promotes democracy by involving the people in the development process within the five districts of Rapti Zone. The RDP has assisted in the development and improvement of the efficiency of the user groups. A lack of knowledge, know-how, and confidence has been the limiting factor among the user groups. The project has provided training and tours to some members of the user groups. Through its contractors and the line agencies, the RDP has also provided these groups with technical assistance in formulating the annual management plans.

Because user groups are composed of rural people with a low level of education, and because the groups are of recent origin, they have a long way to go as far as efficiency is concerned. Hence, they seem to require more attention from the RDP than they have actually received so far. In general, the user groups that are more homogeneous in terms of socioeconomic status seem to be more effective. In terms of sector, the forestry user groups seem more efficient than those of agriculture. The other user groups—in livestock, horticulture, irrigation, and drinking water—vary in their relative efficiency.

User groups are formally identified by sectors. In reality, the sectors are all integrated at the peoples' level. As mentioned earlier, cross-membership exists among the various users groups. Because of the complex nature of the farm system, farm households are forced to belong to many user groups formed along sectoral lines. This state of affairs has important implication for the training provided to the user groups. It was reported that some members of the groups received many types of training whereas others could not benefit from the training. More attention seems to be called for in identifying trainees.

More attention should also be focused on homogeneous user groups to avoid differential benefits and to encourage consensus within the groups. As observed by the LDO of Pyuthan, projects that fulfill the felt need of all members of the group tend to be a success, whereas those demanded only by the dominant members tend to fail. In Rolpa, a village secretary pointed out that group contribution and program initiatives tended to be determined by the relatively well-off and did not benefit the relatively poorer members to the same extent.

## **Review Meeting**

Among the inputs provided by the RDP, perhaps the most useful have been its efforts to facilitate coordination among the local institutions. Review meetings are held periodically at the PCO. There are monthly, quatermester, and annual review meetings.

Representatives of DDC/VDC, and the line agencies are assembled to review the budget and programs and to discuss implementation, coordination, and the progress of various activities within the zone. These review meetings have been instrumental in improving the planning, budgeting, implementation, and coordination of the district institutions. Open discussions and transparency regarding the budgeting have contributed to the knowledge of the local representative bodies.

The interdistrict review meetings, involving all five districts of the Rapti Zone, have also provided the members of the district institutions an opportunity to exchange views and experiences with members from other districts. Once the RDP is phased out, such a mechanism for interdistrict assembly and reviews will no longer exist. Since the government of Nepal views the district as a development unit, in the absence of the RDP such functions may be transferred to the Regional Directorate if deemed necessary.

### **Self-Help Community Development Project**

Another feature of the RDP's effort at institutional development is the Self-Help Community Development Project (SCDP). Project planners recognized that the local development committees had a low resource base and that their scope for action was therefore limited. The SCDP was initiated in 1992 to remedy the situation and thereby activate the local institutions, by encouraging local initiatives and actions.

The SCDP seeks to encourage local initiative and participation in meeting the local needs. Initially, the RDP had about Rs 300,000 to the respective DDCs. Subsequently, the amount was increased to Rs 1.4 million, and then to Rs 3.4 million. At the annual review meeting recently held at PCO, the DDCs reportedly wanted to increase the grant to about Rs 4 million.

The use of this grant entails a matching contribution of 50 percent by the users. The grant is not to be used for nonproductive projects like the building of temples and police posts. The projects under the SCDP are to receive RDP contributions of up to Rs. 100,000, and the projects are to be completed within one year.

The plans prepared by the users are reviewed by the respective DDCs, and the feasibility of selected plans is assessed by the concerned line agency on behalf of the DDC Secretariat. Finally, allocations are made to the feasible schemes. The subdistrict level expressed no complaints about the selection criteria used by the DDC. Although it was natural for various contestants to want their schemes to be selected and approved, on the whole choices made by the DDC were reported to be satisfactory.

Because they knew little about how to purchase equipment, especially the pipes used in drinking water schemes, the communities in Pyuthan decided to entrust this responsibility to the LDO. In order to expedite the works that are to be completed within a fiscal year, the District Assembly also waved its right to approve the schemes prior to their implementation. Such approvals were granted post hoc, when the assembly convened.

The LDOs and the representatives ran into some difficulties regarding the matching contribution of 50 percent to be made by the communities in cash, in kind, or

in labor. The communities, it was said, were finding it difficult to come up with the required amount, although so far they have done so. A survey of SCDP conducted by APROSC in December 1994 found that the communities were in fact contributing about 58 percent. Hence, the difficulties voiced may simply reflect the desire of the communities to reduce the matching contribution, rather than their inability to raise the amount.

Instead, communities appeared to have real difficulty in formulating plans and in conducting and approving the feasibility study. These activities required time, and the schemes tended to be incomplete at the end of the time limit specified for this activity, which was a year. It was reported that many communities were finding it difficult to submit their plans on time. Communities may need further help in formulating their plans on time or even in formulating their plans in general. required.

The encouraging feature of SCDP is that it has provided scope for action to the local institutions. The representatives of the local bodies have been able to utilize the knowledge and skills imparted to them by RDP. It had also promoted user groups and their participation in the development process in their respective areas. The need to mobilize 50 percent of the matching fund also encouraged groups to select schemes benefiting the maximum number of people and schemes reflecting the real needs of the beneficiaries, as indicated by them. In this sense, the RDP, through the SCDP, contributed to democratization and the strengthening of the local institutions.

Further, the officials at the MLD were of the opinion that SCDP approach could be replicated in other parts of the country. The government had been providing Rs 50,000 to the VDCs and about Rs 800,000 to Rs 1 million to the DDCs for development work at the local level. Recently, HMG has decided to raise the grant amount to the VDCs to Rs. 300,000. This grant is to be provided directly to the VDC through the LDO. The MLD, together with the RDP, had formulated guidelines for the utilization of grants under the SCDP. This experience of the MLD is being utilized in formulating similar guidelines for the Rs 300,000 grant provided to the VDCs throughout the country.

However, the local institutions still view the RDP contribution as another budgetary allocation rather than as support that can make them self-reliant in the future. In the area visited, the SCDP's emphasis has been on drinking water and irrigation schemes. Little attention has been given to other income generation schemes or to other types of schemes that would enhance the resource base of the communities, such as roads.

The effort to develop and strengthen the permanent local institutions—namely local governments, line agencies, and user groups—was concerned with improving the efficiency of the institutions through training and the promotion of coordination among district offices, particularly those of forestry, soil conservation and watershed management, and agriculture and through technical assistance.

Training, workshops, and periodic reviews of budgets, plans, and progress have been instrumental in developing a consensus on the to approach and coordination of activities among the district line agencies. A number of line agency staff who had recently been posted to the districts of Rapti Zone from other districts reported that the

concerted activities in the RDP areas were better than in other districts. And the training provided to the line agency staff would be useful not only in the Rapti Zone but also in other places where they might be posted in the future.

However, new incumbents assigned to the Rapti Zone from other districts would need training. Because of the turnover in the bureaucracy, the training provided by RDP to line agency staff needs to be a continuous process in order to enhance and maintain the efficiency of these institutions. As yet, no provision has been made for creating an institution to provide similar training and reviews after the withdrawal of RDP from the area.

Similarly, the RDP has functioned to bring together members of the local institutions of all five district for a review of their budget and plans. This has facilitated the exchange of views and experiences between districts. After the withdrawal of the RDP, such a mechanism for the exchange of views and experiences between the districts will no longer be available. Since the HMG has been considering making the district a unit for development, the lack of such a mechanism would not affect the development process initiated by the RDP.

Although a drain of trained officials from Rapti Zone can be expected to take place, the training provided to the elected representatives, even when not in elected posts, was said to be useful to the district, as they would still be involved in the development of the districts as opposition members. Nevertheless, new incumbents to the elected posts would still require some training. Thus a mechanism to provide continuous training of the type currently being provided by the RDP may be necessary. Hitherto, the chairman and the vice chairman of local government bodies have been targeted for such training. Village-level training conducted by the RDP has enabled the project to provide training to more members of the VDCs. It might be useful to include local political leaders of the opposition parties in the training in order to build a consensus regarding the RDP approach and to prepare the opposition leaders to carry out the task of local development with equal efficiency as well as to promote democracy by encouraging the participation of a responsible and realistic opposition.

The formation of various user groups has improved the ability of the line agencies to deliver their services more effectively than before. Providing line agency services to individual households was not an effective strategy, but with user groups the line agency staff have been able to deal with a larger number of households within a short period of time and with less travel. However, a major limitation experienced by the line agency staff is that distant areas receive less input from them. This is attributed to the insufficiency of travel and daily allowances. Expansion of their area of coverage is thus restricted.

The user group and VDC relationship, were said to be uncertain. Hitherto, the VDC members have assisted the respective user groups within their respective areas. In the identification and selection of plans under the SCDP, the communities are required to obtain approval from the VDC before such schemes are submitted to the DDC. The VDC chairman and vice chairman who have benefitted from RDP training act as advisers to the user groups. However, in some areas, as one VDC chairman reported, people affiliated with opposition parties tended to be suspicious of the attempts by the VDC to

help them. In such areas, as the VDC chairman opined, it would be better for the line agency staff or some external agents to perform such mobilization and advisory functions. Thus the coordinating and facilitating role of the VDC is restricted in areas opposed to the party of the representatives. To some extent, partisan politics have also affected the formation of user groups themselves. As reported by a ranger, user groups are taking twice as long to organize as before. People with similar political affiliations wish to belong to the same user groups.

A VDC chairman had also wondered what the role of VDC would be in the future. VDCs mobilize people, solicit local contribution, and facilitate development activities in their respective areas, but eventually the projects are handed over to the user groups, which are then responsible for their maintenance and operation and share the benefits of the projects among themselves. In this way, the VDCs' role after the handing over of projects seemed to be minimized. Such concerns, however, may not be realistic in that the VDCs would still be required to coordinate various development activities in the districts, and as representatives who depend upon votes, they would still need to assist the user groups. Further, the government's recent decision to provide Rs 300,000 to the VDCs via LDO provides them with enough resources to initiate development activities on their own or in collaboration with neighboring VDCs.

A grant of Rs 300,000 provided directly to the VDCs through the LDO, to be used by them under MLD guidelines, led some DDC members to speculate about their future relationship with the VDC. Such provision would no doubt require the VDC to use a grant provided directly more efficiently. This indicates a further need and scope for institutional development at the VDC level. Since the responsibility for the overall development of the district rests with the DDC, it may have to coordinate the VDC programs within the district, especially those related to inter-VDC projects such as feeder roads or irrigation and drinking water schemes in the border areas of two or more VDCs.

The RDP may do well to enable the DDCs and VDCs to undertake such collaborative ventures. The effort made by the RDP to develop the permanent institutions are far from complete. Many representative members of VDC and DDCs are still of the opinion that the RDP should continue for at least for another phase or, better yet, until the end of the ninth five-year plan. Members of the DDC in Pyuthan felt unable to formulate their own plan and said they have merely signed on the dotted lines approving the plans made by the line agencies and compiled by the LDO. Although they said they were gaining experience through RDP workshops, they had not developed enough confidence and knowledge to formulate appropriate and effective plans by themselves.

To provide continuous training even after the withdrawal of the RDP, an alternative mechanism for carrying on the current training function of RDP should be explored or established, and the training function should be transferred in phases in the prewithdrawal period.

More attention should also be given to the formation of user groups to ensure they are homogeneous in terms of their socioeconomic status and to prevent differential benefits going to people with different status.

In order to ensure equal opportunity in training to all the members, especially of the user groups, selection criteria for trainees need to be developed and applied.

**The traditional perception concerning the RDP's contribution in SCDP—namely, that it is just another budgeting allocation—should be discouraged. And the SCDP funds should be used to promote self-reliance among the communities.**

**In consonance with recent changes that are to provide grants to VDCs directly (via the LDO), the RDP should help the VDCs utilize the grant money fruitfully, promote inter-VDC planning processes, and enable the DDCs to coordinate such inter-VDC activities.**

## **PROJECT INPUT AREAS**

With mixed success, the RDP has operated through HMG line agencies, various technical assistance agencies, and a coordinating office. In addition, it has carried out a large training program and an evaluation progress.

### **HIS MAJESTY'S GOVERNMENT'S LINE AGENCIES**

The various RDP project activities are intended to be sustainable after the project ends. For that to occur, the various line agencies must be engaged in the operations. To this end, substantial project funds provide direct support to the line agencies. The soil conservation work is undoubtedly most closely integrated with the line agency. The forestry work is necessarily carried out in close association with the line agency. The complexity of the various agricultural tasks, including the need for specialized knowledge, the scarcity of adequately trained personnel for specialized tasks, the need to draw directly on technical advice from outside the country because of gaps in the national agricultural research system, and related problems make the task of DOAD particularly difficult in absorbing and applying the positive lessons from the project. In each case, special attention should continue to be given to the integration of activities.

#### **Agriculture**

The DADO is the HMG line agency for carrying out agricultural development activities in the five districts of the RDP. The DADOs operate under the overall direction of the DOAD and are supervised by the Regional Director of Agriculture (RDA) of midwestern region. In 1991 the DADOs underwent a massive reorganization under the government's "one-roof" service delivery policy. Thereafter, DADOs became responsible for the formulation and implementation of the overall agricultural development activities of the district, including crops, horticulture, and livestock. The RDP assistance for the development of crops, horticulture, and livestock of Rapti districts has been channeled through the DADOs.

**FIELD CROP PRODUCTION.** The production of field crops—including rice, maize, wheat, potato, and mustard—is one of the key activities of the DADOs. Cereals and mustard production activities are mainly concentrated in the Dang Valley, and in the foothills and riversides of the other four districts. Maize and potato can be found mostly in the hill districts. The DADOs provide extension advice and training services to the farmer's group through the extension agents located in the service centers. They are backed by subject matter specialists located in the DADO. Demonstration, farmer's tours, farmer's training, and crop competitions are some of the activities of extension programs performed by the field extension worker in the delivery of crop production services.

Extension advice, demonstrations, and farmer's training have become important input to the farmers in promoting the adoption of high-yielding varieties of crops. The RDP assistance to the DADOs for carrying out field crop production extension activities, though minimal, has helped to enhance farmer's knowledge and adoption of high-yielding crop technologies. Large-plot demonstrations in potato and mustard have been directly implemented by Devres/New Era and have been found to be an effective extension model. This is discussed separately in the section on the technical assistance of Devres/New Era.

**HORTICULTURE.** The horticultural activities include the production of fruits, vegetables, and ginger. These form another major area of DADO's program. The horticultural activities also include VFC, which is directly implemented by No-Frills and is concentrated in the pockets of hill districts. The horticulture officer of the DADO of each district is technically responsible for planning and implementing horticultural extension services to the farmers. These services consist mainly of extension advice, farmer training, and plant protection support and are provided to the farmer's group by the field extension agents located in the agricultural service centers. The VFC component of horticultural activities have been implemented by the No-Frills consultants (discussed separately) and is concentrated in Salyan, and Jinabang VDC of Rolpa. The horticultural activities of the line agencies continue to be thinly spread in the district and suffer because of the lack of both manpower and resources.

**LIVESTOCK.** Livestock production activities constitute another major program in each of the five Rapti districts. At present, all the livestock development and animal health service programs are channeled through the technical units in the DADO. The responsibility, authority, and accountability of each technical unit within the DADO has not yet been understood clearly by the officer concerned. This has disrupted the flow of services to the farmers and the monitoring of district program activities. Furthermore, the commitment of the DADOs to the operation plan formulated by the RDP has been rather weak, and thus the available resources are not focused on a few sites, as prescribed in the operation plan. All these factors are responsible for the inadequate

monitoring and supervision of the farmer groups, which in turn has weakened the performance of the established livestock-based farmer groups.

The technical manpower shortage in all the districts should be addressed immediately to improve the efficiency of the work performance of the DADOs throughout the RDP districts. The field workers should be trained in group mobilization, allowed to participate in the planning process through farmer production/resource user groups, and exposed to new technologies in order to improve their capabilities and thus make them more effective in delivering their services to the farmers.

The livestock officers need to be motivated and supervised closely by the DADO and by the RDA. These offices should be involved in group promotion activities in order to sell the appropriate technology package needed to increase production and the income status of different socioeconomic groups of farmers in different ecological belts. The incentive mechanism has to be reviewed and applied so as to recognize and reward the hard-working field workers in the district.

The Ministry of Agriculture should develop appropriate policy guidelines to involve and to monitor private entrepreneurs/NGOs, to contract the development of certain feasible pocket areas that the DADO cannot reach with the available manpower, or alternatively to speed up the commercialization of the agricultural production system. However, the private sector/NGO also needs support to improve their capabilities and efficiency of operation through the availability of training opportunities, access to inputs and services, and changes in certain government rules, regulations, and guidelines to assume the roles and responsibilities entrusted to them.

RDP support for the crop, horticultural, and livestock production activities of the DADOs of five Rapti districts as discussed above has been channeled through the DADO's annual program and budget. The total budgetary support by the project to agriculture (crops, horticulture, livestock) amounts to upward of 67 million rupees (table 3-11).

*Table 3-11. Agriculture Expenditure and USAID Contribution, 1987/88 to 1993/94*

<i>Components</i>	<i>1987/88</i>	<i>1988/89</i>	<i>1989/90</i>	<i>1990/91</i>	<i>1991/92</i>	<i>1992/93</i>	<i>1993/94</i>
Agriculture (Rs)	6.3	7.5	7.4	7.9	8.8	9.8	2.0
USAID (percent)	50	50	50	50	45	40	35
Total of 10 sector <sup>a</sup>	37	47	48	38	46	69	99
Agriculture as a percentage of the total of 10 sectors	17	16	—	21	19	—	20

a. Includes agriculture, horticulture, livestock, forestry, soil conservation, local development office, project coordination office, Women Development Office, roads, District Technical Office.

Source: PCO, Tulsipur Devres/New Era/CARE/N/No-Frills. Annual Progress Report Nepali Fiscal Year 2050/51, Rapti Development Project.

As shown above, the budgetary support to agriculture indicates that the project contribution to the line agencies was initially high and gradually declined from the fifth

year onward to a level of 35 percent in 1993/94. That suggests the line agencies are picking up the additional costs for extension services related to crops, horticulture, and livestock production. Furthermore, the line agencies on their own could continue to provide services to the farmers, particularly in the pocket areas. Any further expansion of activities, such as those in marketing-related activities, would need support.

The above analysis of the project's budgetary support to HMG line agencies for the production of cereal crops, mustard, potato, horticultural crops, and livestock suggests that the RDP has helped the DADOs take up extension responsibilities in the district.

**FORESTRY.** The HMG line agency responsible for the development of community forests is the DOF, in the Ministry of Forest and Soil Conservation. The DOF was established in the early 1940s during the Rana rule, which makes it one of the nation's oldest agencies. This department has District Forest Offices (DFOs) in all 75 districts. The DFOs are subdivided into categories labeled A to E according to the number of officers and subdistrict offices allocated to each district. The Dang DFO is in the class A, with a second-class forest officer in charge. It has three subdistrict offices and 15 range posts. The Pyuthan and Salyan DFOs fall under class D, with only 1 subdistrict office and 8 range posts. Rolpa and Rukum DFOs are class E posts having only 8 range posts and no subdistrict level office.

The forest officers and staff are charged with overseeing the protection and utilization of the national forests. In addition, they have a number of other responsibilities, one of which is to take jurisdictional action against forest offenses. As a result, the staff are unable to provide adequate technical and managerial assistance to FUGs.

The DFOs spend about 70 percent of their time on community forest efforts. However, the budget for the activity is only 30 percent. National forests are being neglected. When asked where national forests are, the general comment, with a wave of the hand toward the horizon, is "Over there." With the establishment of community forests, historic "free" access was prohibited. As a result, there has been a shift to gathering wood from what are called national forests, which government foresters are obviously not administering at the level required.

### **Soil Conservation**

The DSCO in the five districts are the main HMG line agencies conducting the soil and water conservation program in RDP. These offices are under the direct control of the DSCWM which was established in 1974 in Ministry of Forest and Soil Conservation. In contrast to DFOs, the DSCOs have few policing and jurisdictional responsibilities. Consequently, the officers and staff are able to put more time and effort into the technical aspects of soil conservation planning and implementation.

The DSCWM headquarters has the expertise and facilities to carry out this task. But the same is not true of the district offices. Consequently, the technological level that is required for effective planning and implementation of soil conservation and watershed management works is not present; nor is it likely to be so in the near future without enhancing the quality and quantity of technical support to DSCOs from the DSCWM headquarters and/or private consultants.

### **Local Development Office**

To coordinate the activities of the various line agencies well local government institutions at the district level, a second-class gazetted officer of the Ministry of Local Development is appointed as a Local Development Officer (LDO). The LDO is also the secretary of the DDC. Apart from other support staff, the LDO is assisted by a planning officer and a monitoring and evaluation officer.

The LDO is primarily responsible for facilitating the implementation of district-level projects and for monitoring and evaluating them. The intersectoral plans are compiled by the LDO through review meetings. The conduct of feasibility studies, appointment of overseers and technicians, and provision of equipment and materials to DDC/VDC development efforts are all facilitated by the LDO.

Under the MLD, the Women Development Office of the Women Development Division operates in about 49 districts of Nepal, in about 221 VDCs. The five districts of Rapti Zone are included. The plans made by the WDO are forwarded to the LDO, which helps incorporate women development plans in the sectoral plans of the line agencies, while formulating a comprehensive district development plan.

RDP programs are also implemented through the LDO, via the respective DDCs/VDCs. In particular, the SCDP of RDP is channeled through the LDO's secretariat, involving the DDCs and VDCs.

The DDCs and VDCs, together with the LDO, are part of HMG's administrative structure for local development and are therefore permanent institutions. The political representative bodies of the VDCs and the DDCs are linked and coordinated with the line agencies through this structural arrangement. The Ministry of Local Development assists the local representative bodies with administrative and financial procedures and provides technical assistance to the DDCs/VDCs and the user groups through this permanent arrangement.

The efficiency of the LDO secretariat, as well as that of the DDCs/VDCs, WDO, and user groups, has bearing on the nature and speed of local development in the districts. As part of its institutional development effort, the RDP has provided training and support inputs to these institutions. About seven staff in the LDO secretariat are supported by RDP.

Training in data collection and utilization, monitoring and evaluation, and the formation of operational plans, together with review meetings at the PCO, has contributed to the effectiveness of the LDO secretariat and the DDCs/VDCs.

## **PROJECT COORDINATION OFFICE**

The project coordinator is a second-class gazetted officer of the MLD, and apart from performing the coordinating function, he acts as a liaison officer between USAID/RDP and MLD. The PCO facilitates and implements its programs indirectly through the contractors, LDOs, line agencies, and WDOs. It also provides logistic support. For example, it transports materials and equipment to the program sites and facilitates communication.

The contractors and other implementing agencies are required to submit periodic progress reports to the PCO. Such reports, together with the review meetings, form the basis for monitoring and coordinating the activities of the implementing agencies. Field visits by the sectoral officers of the PCO also form the basis for monitoring and evaluating the performances of the line agencies.

The monthly and quarterly meetings at the DDC office, and the annual budget and planning meetings at the PCO (which include the program implementors and the members of DDC and user groups) are held to clarify RDP objectives, promote transparency, build a consensus among the implementing agencies and the beneficiaries, and allow the PCO to provide feedback.

As part of its monitoring and evaluation function, the PCO compiles baseline data and helps in the creation of site profiles. These profiles include information on geographic locations, land use, and forest resource utilization, together with indicators of the well-being of the community and households. The PCO began compiling group profiles about two years ago.

However, the PCO has not always been able to compile and update these profiles. Often it does not receive complete and timely data from the field. Initially, the village secretaries were trained in data compilation, but their performance was said to be unsatisfactory. The problem here and in the line agencies is said to be a lack of incentive and manpower. Further, data collection and presentation activities are considered time-consuming, especially because the line agencies have to supply such data in different formats to the PCO and their respective ministries.

One of the RDP's objectives was to help create a data base at the DDC/VDC level and to promote the use of such data in formatting and evaluating plans. If the data are difficult to update at the PCO level, it would be unrealistic to assume that such activities could be easily accomplished at the district and subdistrict levels.

Because of the ease of communication, more RDP activities have taken place in Dang than in the remote district of Rukum. Also, monitoring and evaluation of the PCO have tended to be more frequent in more accessible districts than in the remoter ones.

Apart from the monitoring and evaluation, the PCO conducts and facilitates various evaluation studies and research and also facilitates the development of strategies, approaches, and training manuals. In addition, it conducts various types of training and tours as part of its own programs.

Although the PCO's workshops, meetings, and training conducted have been considered effective and useful, there is scope for improvement. The various kinds of training are devised and imparted in accordance with the demand made by the district implementing agencies. Recently, the PCO also sent questionnaires to the local NGOs in the five districts to ascertain their willingness to undergo training and to find out the

type of training they wished to have. When training is to be conducted, the PCO asks its implementing agencies to send over a specified number of trainees. The implementing agencies at the district level select and send the specified number.

Thus, the training provided tends to be of the type demanded by the line agencies or the NGOs. Devres/New Era carried out an assessment of trainings for all of its key training interventions, including TARC, FACT, and support to workshops, the importance of which has been highlighted elsewhere in this report. The selection of trainees did not seem to be based on any particular criteria. It was left to the discretion of the line agencies.

Through its workshops and review meetings, the PCO facilitated transparency, expanded discussions, and oriented the implementing agencies toward concerted action. Such review meetings and workshops have also served as training sessions and have provided the PCO with a means of monitoring and evaluating the performances.

At the same time, the PCO needs to put more emphasis on updating its data and profiles. Data should be retrieved from the field on a regular and timely basis. The reluctance of agencies to provide data to the PCO should be investigated in depth and the problems resolved. Greater balance also needs to be introduced in the intensity of PCO activities in accessible districts compared with the relatively inaccessible ones. The PCO should conduct a series of training studies to assess training needs and develop criteria for the selection of trainees, in addition to providing the kind of training that is in demand. In selecting trainees, especially those from the user groups, it must take care to prevent any duplication of training, in view of the cross-membership among the various types of user groups in each locality.

## **TECHNICAL ASSISTANCE**

Four main groups have provided technical assistance to the RDP, as explained in the following sections.

### **Devres/New Era**

Technical assistance has focused primarily on line agencies and is provided through the government's PCO by the joint expatriate/Nepali Devres/New Era team under a USAID contract. The scope of work under the contract was established by USAID and agreed to by the Ministry for Local Development. Specific activities of the Devres/New Era team were defined in the PCO's annual workplans and were carried out under the direction of the project coordinator. These were prepared in May for each coming fiscal year and were based on the line agency annual plans prepared at annual workshops held each January.

The Devres/New Era TA team had four responsibilities: to advise the government and USAID on strategies for achieving project objectives; to review the progress of line agency programs in achieving project objectives; to recommend ways to improve program performance; and to design and test models that might better respond to village-level development needs.

As might be expected, much of the TA team's work in the first three areas consisted of preparing reports and analyses or providing support for workshops and seminars. The team also helped the project coordinator develop district institutions and provided general support in such areas as planning, monitoring, training, and administration.

In response to the recommendations of the midterm evaluation, the TA team advisers shifted their focus as much as possible to the fourth of the above areas, guided by the operational plans agreed to by USAID and the four (now three) main extension agencies. Specifically, they field-tested appropriate technologies (particularly those used to support high-value commodities), organized and supported local groups, and supported training for farmers and HMG staff. This shift in focus (plus the provision of a small "technical support fund" under the contract) enabled the TA team to carry out activities more freely at specific sites. In addition, the team helped introduce the successful elements of the efforts of other teams into district extension programs. The TA team's reports on field activities consistently included advice on strategies and recommendations on ways to improve program performance.

The scope of work outlined in the contract specified the basic responsibilities of individual advisers, namely, to provide riveting technical guidance to the implementing agencies of government; to analyze and identify opportunities for change in existing production systems; and to work with government officers to support these opportunities.

The Devres/New ERA team made several significant contributions:

- Developed the FACT and TARC training models.
- Developed workshop procedures and guidelines for handing community forests over to user groups and planning local extension activities with farmers.
- Prepared line agency operational plans in close collaboration with line agency leaders.
- Supported PCO and district workshops with a view to clearly defining and focusing on the project's vision of participatory market-led development.

Table 3-12 shows the level of technical assistance provided by Devres/New Era/Winrock. The greatest effort, 25 percent of the total, went into to the forestry component, followed by 21 percent for crops; 16 percent each for livestock, local government, and development; and 5 percent for soil conservation and watershed management. The table also shows that the TA level of effort was greater in the first four years of Phase II and was greatly reduced in the last two years. The person-months of expatriate and Nepali TA were equally distributed.

The U.S. Peace Corps and Netherlands Volunteers have been assisting DFO and DSCO offices put in place under the community forestry program. They have been helping to establish tree nurseries and introduce forest management to the FUGs. The two forestry volunteers we came into contact with were women. They are stationed within the localities and have been effective in working with women by integrating them into FUGs and holding literacy classes.

Table 3-12. Devres/New Era/Winrock Technical Assistance Level of Effort, 1990/91-1994/95

Activities	Pre-MTE <sup>a</sup> (through 7/90)		1990/91		1991/1992		1992/93		1993/94		1994/95		GRAND TOTAL	
	Expat PPM <sup>b</sup> %	Nepali PPM %	Expatriate PPM %	Nepali PPM %	Expatriate PPM %	Nepali PPM %	Expatriate PPM %	Nepali PPM %	Expatriate PPM %	Nepali PPM %	Expatriate PPM %	Nepali PPM %	Expatriate PPM %	Nepali PPM %
Crops	7.0 8	57.1 23	4.4 15	19.8 19	9.2 23	20.2 18	7.4 28	15.8 19	0.5 7	15.0 26	0.4 7	8.2 26	28.9 15	136.1 21
Livestock	15.8 17	28.5 11	2.6 9	15.2 14	4.6 12	19.3 17	2.1 8	17.4 21	0.3 4	12.0 21	0.2 4	9.0 29	25.6 13	101.4 16
Forestry	22.9 25	68.7 28	10.2 34	24.1 23	10.6 27	27.8 25	3.0 12	19.9 24	0.3 5	13.7 24	0.3 5	6.8 22	47.3 24	161.0 25
Soil conservation and watershed management	4.2 5	6.3 3	2.6 9	6.1 6	1.8 5	5.3 5	0.8 3	5.1 6	0.1 2	5.2 9	0.1 2	3.8 12	9.6 5	31.8 5
Local gov't and development	6.4 7	38.2 15	1.6 5	19.0 18	3.0 8	21.4 19	2.7 10	15.8 19	0.7 10	7.5 13	0.6 10	1.3 4	15.0 8	103.2 16
Others	34.2 38	49.0 20	8.5 28	21.9 21	10.3 26	17.0 15	10.0 38	7.7 9	4.8 72	3.9 7	4.0 72	2.4 7	71.8 36	101.9 16
Total (person-months)	90.5 100	247.8 100	29.9 100	106.1 101	39.5 101	111.0 99	26.0 99	81.7 98	6.7 100	57.3 100	5.6 100	31.5 100	198.2 100	635.4 100
Total (percentage of total level-of-effort)	46.0	39.0	15.0	17.0	20.0	17.0	13.0	13.0	3.0	9.0	3.0	5.0	100.0	100.0

a. Midterm evaluation.

b. Persons per month.

Source: Devres/New Era, Rapti Development Project, Tulsipur.

## **No-Frills**

A local firm, No-Frills Consultants, has been providing technical assistance and other support needed by HMG line agencies, farmers, and local farmers' organization to implement the VFC crops program. The No-Frills Consultants provide training and support directly to private growers to develop the skills of these entrepreneurs and to manage their own VFC-related enterprises with minimal support from government line agencies.

An important component of RDP, the VFC program aims at increasing vegetable, fruit, and cash-crop/animal productivity by building local capacity. The VFC program has two main objectives: (1) to establish sustainable VFC private enterprises by developing the technical and managerial skills of entrepreneurs and by developing market channels and middlemen to handle VFC products; and (2) to develop local resource centers for VFC-related technological inputs and technical skills.

In order to carry out these activities, No-Frills has engaged seven technicians: one program coordinator, one market extension specialist, and five site coordinators.

Following the baseline household survey in 1988, No-Frills selected 52 potential priority sites for the development of high-value cash crops in all five districts of the Rapti Zone. Initially, No-Frills, with the help of a district site coordinator and consultants and trainers, emphasized the production of cash crops but gave little attention to marketing. Door-to-door extension services were provided to local farmer producers. Training, visits and tours, technology packages, and inputs such as seed materials were provided to farmer producers. These efforts led to the development of a cadre of 263 skilled trainer farmers.

Farmers then began producing Vegetables and vegetable seed on a small scale for local markets. The cash income they earned encouraged them to increase the production of vegetables and vegetable seeds. This increased production led them to look for outside markets. No-Frills developed 10 market profiles for 10 different cash crops and identified the main market centers/towns likely to offer profitable marketing.

As a result of these studies, the second phase of the program put more emphasis on developing markets and business enterprises. In this second phase, beginning in 1993, No-Frills started working on 10 priority activities, mainly related to market-led activities. One such activity consisted of market-development workshops. Another consisted of establishing business linkages between Rapti farmer producers and traders/investors. A vegetable seed workshop held in 1994 has resulted in advanced contracting for 125 metric tons of different vegetable seeds. Through local participation, the program was able to establish four periodic markets (*haat bazar*) and two collection centers. These *haat bazars* have a system of disseminating information on the prevailing prices of different commodities in the Nepalese and bordering Indian markets. The activities carried out by No-Frills through the VFC program have contributed significantly to the production and marketing of vegetables, vegetable seeds, fruits (apple, citrus), and cash crops.

Extension services provided by No-Frills have created a model for fruit and vegetable production and marketing in pocket areas such as Jinabang. The replicability

of this model in other parts of the Rapti hills needs to be examined carefully. Since this model is based on the organization of user groups and the mobilization of local resources, the model is likely to be sustainable. The results indicate that a private extension unit would perform well in developing the capacity of local farmers. This kind of TA support from external sources would be needed to achieve a sound and capable VFC market program and is recommended for another phase of the project.

### **National Cooperative Business Association**

The NCBA was one of the RDP's contractors, together with Devres/New Era, CARE/N, and No-Frills. Its function was to promote the growth of private entrepreneurs in the five districts of Rapti Zone.

In 1993, RDP's contract with NCBA was terminated, because USAID/N was dissatisfied with the association's performance. It was said that NCBA had plans but was unable to transform them into concrete action. The final evaluation team was also unable to discern any direct contribution during the field visits but noted that it had undertaken a series of training with a USAID grant.

About 20 staff of Appropriate Technology Unit/Private Enterprise Unit (ATU/PEU) at ADBN benefitted from the NCBA training and observational tours. The ATU/PEU of ADBN had been promoting entrepreneurial development, and one example of these efforts was a case in Tarigaon, Dang. Through these efforts, Dilli B. Basnayat, a former wholesaler in grains, was able to establish an oil mill. The ATU/PEU of ADBN had been conducting enterprise development programs and appropriate technology programs since 1987 (table 3-13). Sagar Joshi and Tanka Bhatta of ATU/PEU were of the opinion that the training the NCBA had provided to their staff had been useful in the performance of their task.

Some of the lasting effect of NCBA activities was also discerned at the ATU/PEU of ADBN office in Tulsipur. Some 20 persons who had benefitted from NCBA training were using it to promote enterprise development.

Perhaps RDP's employment of NCBA was premature, in that its objectives could not be fully met until certain basic precondition were met. The RDP had, it seemed, assumed that efforts required to increase production, promote cash crops, and develop entrepreneurial ventures could be undertaken simultaneously. Unless a surplus could be generated, however, and the subsistence agro-economy transformed into a market-oriented one, it would be unrealistic to expect the substantial development of enterprises.

The evaluation team found that the RDP had increased and improved agricultural, horticultural, and livestock production in the pocket areas where it had concentrated, and that it also contributed to the improvement of community forestry. But problems related to the marketing of products were discerned in most of the areas. Hence, emphasis came to be put on promoting markets, to enable the producer to compete with low-cost Indian products, expand the existing market base, and promote agro-based industries. Thus an agency like the NCBA seems to be more useful at this stage of the RDP rather than earlier. The ATU/PEU could be strengthened further, and other national institutions

(such as the Management Association of Nepal), as well as foreign agencies specializing in marketing and entrepreneurial development, could be entrusted with this task.

*Table 3-13. Achievement and Impact of ADBN's Appropriate Technology and Private Enterprise Development Center, Dang, 1989-94*

<i>Activities</i>	<i>Number</i>	<i>Persons involved</i>		<i>Total</i>
		<i>Male</i>	<i>Female</i>	
<i>A. Enterprise Development Program</i>				
	25	353	64	417
	10	134	32	166
ECD training	19	131	4	135
Skill dev. training	6	61	14	75
Business mgt. training	12	17	35	52
MKT linkage/promotion	9	6	9	15
Seed money assistance	28	455	15	470
Workshops/seminars	14	86	55	141
Business group formation	21	135	12	147
Follow-up/consultancy				
<b>Total</b>	<b>144</b>	<b>1378</b>	<b>240</b>	<b>1618</b>

<i>Technologies</i>	<i>Number distributed</i>
<i>B. Appropriate Technology Service Program</i>	
	2
Water turbine installation	2
Hydrant installation	62
Shallow tubewell installation	34
Sprinkler irr. system installation	195
Powerpump installation	2
Riverpump installation	4
Rainwater collection dam const.	15
Improved beehive distribution	108
Seed bin distribution	65
Improved cook-stoves dist.	85
Cement tile vibrating machine dist.	9
Low-cost housing const.	7
Peltric set installation	2
Rural electrification program	2
Electrification from solar panel	

<i>Technologies</i>	<i>Number distributed</i>
<i>C. Appropriate Technology Service Program</i>	
Water turbine installation	2
Hydrum installation	62
Shallow tubewell installation	34
Sprinkler irr. system installation	195
Powerpump installation	2
Riverpump installation	4
Rainwater collection dam const.	15
Improved beehive distribution	108
Seed bin distribution	65
Improved cook-stoves dist.	85
Cement tile vibrating machine dist.	9
Low-cost housing const.	7
Peltric set installation	2
Rural electrification program	2
Electrification from solar panel	1
Hollow block const. machine	2
Greenhouse const.	4
Shellar store const.	2
Honey extractor const.	1
Concrete block const./main	1
Timur plucking machine	1
Charcoal-making drum const.	37
Surface irrigation system	

<i>Technologies</i>	<i>Number distributed</i>
<i>D. Technology Training</i>	
Pumpset maintenance	19
Boring nechanic	32
Powerpump installation	19
Cement tile manufacturing	40
Stabilized soil brick const.	2
Riverpump installation	5
Peltric set installation/main	14
Sprinkler installation/main	21
Fruit processing	20

<i>Technologies</i>	<i>Number distributed</i>
<i>E. Achievement and Impact of Technology and Business Development Program</i>	409
	196
Business promoted through ed program	120
Business run by ECD training participants	36 KW
Business run by technology adaptors	3,582 ha.
Energy production	1,114 persons
Irrigation facilities developed	48,450 thousand
Employment opportunity generated	2,6222 thousand
Total capital investment (bank + private)	
Bank loan finance	

*Source:* Agriculture Development Bank handout from Tulsipur, Dang, Nepal.

### CARE/Nepal-ADBN

The CARE/Nepal technical assistance to the ADBN lending to farmers has been and efficient cost-effective effort. The project has undertaken 36 small surface irrigation projects, covering a command area of 2,829 hectares and 3,211 households (*Annual Progress Report 2050/51*). Thus, the average project covered 79 hectares, and the average land covered per household was slightly less than a hectare. All but 5 of the projects were in Dang district.

The striking feature of the project is the low average cost per hectare covered—it ranges from a low of Rs 1,916 to a high of Rs 21, 291. The costs clustered around Rs 5,000 and Rs 15,000. That compares with an average cost of Rs 20,000 per hectare for new shallow tubewell projects in Nepal, Rs 120,000 for deep tubewells, Rs. 150,000 for new terai surface schemes, and Rs 11,000 simply for the costs of transferring the management of such projects from the Department of Irrigation to users' groups (APP 1995, Chapter 4). It is obvious that using a local NGO drastically reduces costs of providing irrigation.

The project example should be expanded with ADBN on a nationwide basis. However, groundwater development is far superior to surface diversion schemes in the Dang Valley. Under the APP, groundwater development is the centerpiece of agricultural growth in the terai districts. The average cost of shallow tubewell development is comparable to that of the CARE/Nepal surface schemes and provides far more water and better control, and hence the opportunity to radically increase farmer incomes.

Shallow tubewell development is usually fraught with organizational problems, however. Farmer groups have to be organized, since the wells cover 4 to 8 times the amount of land farmers normally have in contiguous plots, depending on the degree of land fragmentation. The wells need to be clustered so that cattle can be more easily controlled in the newly available cropping seasons. Research, demonstration, and extension all need to shift their attention to high-intensity cropping systems.

In Dang, the area available to shallow tubewells and left for the more expensive deep tubewells may be less than is generally the case in the terai. Nevertheless, a substantial number of wells have been drilled under diverse topographic conditions in Dang Valley and the failure rates seem to run at only 10 percent. However, the wells are now scattered, farmers cannot control cattle, their cropping systems are not intensive enough, they do not grow enough vegetables and other high-value crops, and they are not exploring adequately the scope for high-quality fodder and hence increased production of lower cost milk. The ADBN will remain the lead agency and principal funder of shallow tubewells. Thus there is much for a project like CARE/Nepal to do in this highly productive area of development. Experience with the existing small irrigation project indicates that development would be of great value.

Deep tubewells will also be of importance in Dang and will also require an major farmer organization input. That could also be a useful application of the project experience.

### **EVALUATION AND SPECIAL STUDIES**

The RDP has been guided by various studies, impact assessments, and evaluations. A change in RDP orientation from a zonal approach to pocket areas of concentration, and from infrastructure building to efforts to increase farm productivity had been guided by the evaluations and special studies. As a whole, the integrated zonal development approach was discarded and special areas and pockets targeted for the developmental effort. Consequently, in 1987 the name of the USAID project was changed from Integrated Rural Development Project (IRDP) to simply Rapti Development Project (RDP).

Efforts to increase farm productivity through the introduction of improved seed quality, the construction of irrigation facilities, introduction of chemical fertilizers, and improved livestock were not found to be sufficient to promote the well-being of the farmers in the area. Following the midterm evaluation, the RDP began focusing on increasing the cash income of farm households. Consequently, the RDP oriented its program toward cash crops and horticulture more intensively. the increase in agricultural production and emphasis on cash crops have made it necessary to focus attention on marketing and agro-based industries.

In addition to the macro-studies encompassing all the efforts of the RDP, impact assessments and evaluations of selected programs have also been undertaken. These include an impact study of TARC training (1993), experimental reports prepared periodically by the contracting agencies, evaluation of Production Credit for Rural Women 1994, and an effectiveness study of the self-help community development project (1994). All of these studies have helped focus the attention of the RDP on emerging issues and have provided useful feedback.

Particularly important are the experimental reports that have sought to identify locations for the introduction of cash crops, vegetables, and fruits. Some of these reports also describe the results of experiments in forest cultivation, or in areas where new

technologies have been introduced. Such experiments need to be continued in order to identify appropriate and viable locations for high-value marketable crops, to discover the most cost-effective and productive techniques of forest management, and to enhance the efficacy of various programs. A systematic analysis and compilation of the available experimental reports would be a valuable contribution in that it would identify the programs and activities that could be replicated in other parts of the country.

The PCO has the manpower and financial support needed to collect the necessary information for this purpose. Community profiles have already been compiled, along with an inventory of village resources, indicators of well-being in the communities and in the households within the targeted communities, and population data. Such data have not been regularly updated, however, because of collection and retrieval problems. Nevertheless, the value of such exercises has already been demonstrated following RDP's midterm evaluation and the use of the results to alter the project's approaches and thereby improve its effectiveness. Periodic micro-studies, impact assessments, and evaluations of selected component programs would also be of some interest, particularly to technical specialists and the designers of programs.

All such baseline studies and data profiles compiled by the monitoring and evaluation unit of PCO could be of immense value in monitoring the progress of various pocket areas targeted by the RDP. As already mentioned, the PCO has had persistent problems with the timely updating of such data. However, it is seeking ways to overcome them.

As a result of RDP's monitoring and evaluation effort, excellent data are available on each element of the project and activities in the pocket villages. Some of this material is included in Annex 5 of this report. The data on cash incomes in specific pocket villages, project inputs, and their detailed composition have been particularly useful.

The single largest data collection effort specifically directed at monitoring and evaluation was the large, random sample survey conducted at the beginning of the project by APROSC and a subsequent 10-year follow-up study. Unfortunately, substantial gaps in these data make it difficult to draw policy recommendations from them or to assess the impact of the project, even in the pocket villages. Their main drawback is that they refer only to cash incomes, which is understandable, understandable, given the project's correct emphasis on cash income. However, cash and in-kind or subsistence income interact, sometimes reinforcing each other and sometimes substituting. Those effects will vary between the terai and the hills, and even within those broad regions. In the future, data collection could be pointed in a more profitable direction to ensure that a better data base is developed for unanticipated analyses.

Because the project is expected to have a long-run aggregate effect, even though the initial effort has concentrated on demonstration pockets, project evaluation has the potential to shed light on some important policy issues. This kind of effort has already proved to be helpful in identifying appropriate fertilizer policy, although it could have weighed in more heavily. The project could also have put more emphasis on what will undoubtedly be an important upcoming debate on cash-crop commercialization in the hills and mountains as opposed to marginally improved subsistence farming. The debate will hinge not only on incomes produced but also on the breadth of participation and social

effects. These are all complex issues, represented in the project efforts and impacts and imperfectly analyzed, particularly with respect to their interactions. The debate on roads will also be important, particularly in regard to the hills and to district versus agricultural feeder roads.

A few other points should be mentioned concerning the collection of data. First, PCO personnel may require special training and/or a technical adviser to assist in this task. Second, monitoring and evaluation data could be linked with data related to the various interventions, the duration of their impact, and their effects. Comparisons could then be made between target areas and larger surrounding areas. Third, efforts to compare data in different pockets of intervention could be used to measure the relative progress of the areas of intervention. Fourth, soil, forestry, and water studies could be integrated with, or at least related to practical training, workshops, and demonstrations in well-defined agroecological zones of the RDP area. And fifth, working maps and aerial photographs should be used in assessing, planning, programming, and implementing the forestry and soil and water conservation program.

## TRAINING

The RDP has provided various types of training for participants from the various institutions, agencies, and organizations, as well as individuals. The staff of the line agencies, PCO, WDO, and the secretariat of the DDC, as well as members of the DDC/VDC and user groups, have benefitted from such training. This training has been imparted through line agencies, the PCO, and contractors. The RDP also facilitates short and long-term training abroad and within Nepal. Study tours within the country and abroad are also conducted from time to time.

Regular planning and review meetings and workshops in the PCO and village workshops have been particularly helpful in imparting knowledge and skills to the members of the local representative bodies and the staff of the line agencies. Such activities have been instrumental in bringing about a consensus between the DDC/VDC and the line agencies in the districts. Line agency staff, in particular, were motivated to alter their traditional bureaucratic attitude and have become increasingly receptive to the idea of local participation and coordination among the line agencies. PRA techniques have been especially successful in encouraging line agencies and local people to participate in micro-watershed protection activities such as those in the Khumale VDC area of Rolpa.

The training developed by Devres/New Era (such as TARC and FACT training) and provided to field extension staff, WDOs, and DFOs were reported to be particularly useful. Such training enabled the staff to deal effectively and democratically with user groups. The CRMS developed an approach in which the field extension workers could work effectively with user groups so as to help them better manage their farm and forest resources through their involvement in the extension programs.

Participant training has been a most effective means of developing the capacity of local institutions and promoting interinstitutional cooperation. This training has been achieved through direct instruction, workshops, and practical involvement in identifying

needs and planning appropriate actions. It has been extended to members of the user groups, members of local government, and the staff of the line agencies.

Such training could have an effect at the national, district, and the project levels. The training received by government officials, because of their turnover, could be utilized in other parts of the country where they may be transferred. There has already been some indication that this is happening.

In particular, the DOA, DOF, and MLD seem to have adopted some of RDP's features. The involvement of the elected representatives of the DDC/VDC has enabled them to exercise their acquired knowledge and skills in their respective districts and subdistricts beyond the RDP targeted pocket areas. Within the RDP areas, the effort to build the capacity of the user groups has not only made them more efficient but has also set in motion the process of democratization, through which the people have been able to mobilize themselves and obtain services from the line agencies to fulfill their own needs and thus further their own interests. As these skills and knowledge spread to other local areas, the democratic process will also gain hold among other user groups in other areas. The SCDP budgeted through the LDO has enabled the DDC, VDC, and the user groups to benefit from undertaking small community projects in areas not specifically targeted by the RDP. The guidelines of RDP/MLD and the operational plan devised by the RDP are also implemented beyond the targeted areas.

Despite these positive effects, there is further scope for the refinement, consolidation, and expansion of the training provided by the RDP. Training among the DDC/VDC and the user groups is still limited in coverage. Furthermore, such training needs to promote a broad consensus among most of the members within a targeted institution through the development of a shared perspective. Village workshops, demonstrations, and practical training involving the people through direct participation can promote these ends.

Procedures for the selection of trainees, particularly in the user groups, could also be improved. As mentioned earlier, trainees are not usually selected through any assessment of needs but happen to be those sent by the concerned agency. Usually a specified quota is allocated to an institution, and it is asked to send that number for a training session or the tours. Thus no criteria have yet been developed for the selection of trainees. One village secretary noted that some people tend to be selected for variety of trainings over and over again, whereas others have never been given any training, not even once.

Trained persons could be retained within the targeted institution and given an opportunity and the means to use the skills they have learned, so as to maximize the effects of this training. From time to time, it will also be necessary to upgrade the training sessions technically and to extend them to the various parts of these districts.

Training is a continuous process, its sustainability is ensured only when a permanent agency exists to provide continuity to the training process. Training and coordinating functions hitherto performed by the RDP will have to be transferred to a permanent agency or agencies, after the termination of the RDP.

## INTEGRATED ACTIVITIES

### LOCAL INVOLVEMENT

The government of Nepal has always encouraged people to participate in various developmental activities. In previous times, the emphasis was on their labor contribution only. In more recent times, it has shifted to forming user groups and involving them in the development process, from the planning stages up to operation and maintenance. In other words, projects are now being handed over to the user groups.

In the Rapti Zone, the RDP has facilitated this process of involving people in user groups and giving them projects to manage. In particular, the RDP's attempt to promote institutional development has made the user groups more capable of participating in the development activities within the district.

Through their respective user groups, people are now involved in agriculture, horticulture, livestock, forestry, and the construction of minor irrigation canals, the management of drinking water, the construction of schools and community buildings, and income-generating activities. This involvement was evident from people's willingness to participate in the development ventures and their receptiveness to various kinds of advice from the development workers at the RDP sites.

This positive attitude has made the work of the extension workers more effective. Previously, development workers in the field were hard pressed to provide their respective services to individual households. Now in dealing with the groups, the venue and time for their visits can easily be fixed, and they are able to provide their services to many people in a shorter period.

Conversely, the people involved also seem to favor this group approach. Collective efforts are said to be more fruitful than individual ones. As one respondent put it, "One can do many more things with five fingers than with only one." Their voices have become more readily heard by the extension workers and their demands more readily met.

The user group approach encourages local involvement. Through these groups the people receive extension services, training, and demonstration inputs from different project actors, including the line agencies.

The extent of local involvement varies, depending on the needs of the people, their knowledge, and perceived benefit from a given program. Because of the RDP's emphasis on involving the pocket areas in the planning and implementation process, the people there are able to identify their own needs, find their own solutions, and undertake responsibility. The participatory rural appraisal, village workshops, and community resource management systems have been effective in encouraging local involvement.

Literacy programs supported by the RDP, have been most effective in increasing the awareness and capacity of women to manage their own affairs. These programs have served as an entry point for the formation of women user groups and their subsequent involvement in development activities.

Although the extent of women's involvement in agriculture, soil conservation, forestry, and livestock has been encouraging in that women's groups tend to be more active than those of the men, the support received for their involvement has not been sufficient. Line agency guidelines stipulate support for the formation of 25 percent of the women user groups, but in actual practice these guidelines have not been seriously followed.

Involvement of the poor and underprivileged requires special attention. The risks they bear and their low investment capacity have naturally limited their involvement. CARE/N has been working with the small farmers. Although such farmers have been provided with loans and matching funds, the support in terms of training, extension, the availability of services, and the marketing of produce has been restricted.

Special factors need to be taken into account in designing a technology package for the poor. A case in point is the effort put into promoting the Pakhribas black pig, which has managed to cater to the needs of the disadvantaged Tharu communities in Dang and consequently has encouraged their involvement.

The provision of loans to buy improved livestock but not for local breeds has also limited the involvement of the poorer farmers. It takes more inputs to rear the improved variety of breeds, but these inputs are usually beyond the means of the poorer farmers. Such restrictions limit the involvement of the poor in the RDP efforts.

Apart from the user groups, local NGOs were also found to be eager to be participate in development activities. In Pyuthan, Bijuar, youth clubs called Jan Jyoti and Kalika helped the VDC promote a haat bazar. They also provided financial assistance for the effort.

The willingness of the local NGO to be involved in the development activities was also evident at the PCO training unit. About 53 local NGOs from the five districts of the Rapti Zone expressed an interest in participating in the training provided by the RDP. The type of training preferred was in subjects such as project management, preparing proposals for projects, baseline surveys, monitoring, supervision, and evaluation—all of which indicate the desire of the NGOs to be involved in development-related activities as well as to enhance their capacity for such endeavors.

People in the RDP areas could also be seen participating in the marketing process. Some farmers were taking part in the project-sponsored workshops designed to promote marketing. These workshops have given farm producers a chance to meet and interact with traders to establish marketing links for their surpluses. Encouragement of periodic

markets (haat bazar) in various locations are also enabling the producers and traders to promote organized agricultural marketing. In Jinabang, an agricultural entrepreneurial association has been established to deal with cash crops. Such developments are still in their formative stages, however, and require more input from the RDP.

A scheme called Venture Capital, initiated by ATU of ADBN in 1991, has also encouraged local participation in productive enterprises. It is still at an experimental stage but shows signs of success. Individuals or groups of people join together with the ADBN to undertake an enterprise, with each investing 50 percent of the required capital. Both the losses and the benefits are shared equally by the bank and the entrepreneurs. Later, the successful entrepreneurs are entitled to buy the bank's share and function independently. Such joint ventures have been involved in Babari goat rearing, the production of ginger powder, and in wicker basket manufacturing in Dang.

The lack of knowledge, information, know-how, and skills has kept many people from becoming more involved in the development process. Although they are capable of identifying their needs, their initiatives are hampered by a lack of resource and technical knowledge. RDP efforts to increase the people's organizational capacity through training and participation in planning and implementation have ameliorated some of these limiting factors.

Through their various user groups, people have been able to demand and obtain services from the line agencies. Matching grants through the SCDP have also encouraged the communities to generate 50 percent of the resources. Loans provided for the SFCP—although they vary in amount, depending on the nature of the project being undertaken—are said to be about 20 to 40 percent of the total project cost. This means that the small farmer groups have the capacity to generate about 60 to 80 percent of the resources to complete the projects.

Problems arising from the lack of resources are also being resolved to some extent through increasing self-help activities that contribute matching grants in term of labor or money, user group funds for development activities, the sale of forest and forage products from community forests, and general revenue from community cultivation and the increased involvement of local NGOs.

Youth clubs in Reghuga/Rolpa and Bijuwar/Pyuthan, for example, have financed the establishment of a haat bazar. They have demonstrated the ability of local groups to overcome some of their resource constraints. The need to provide matching funds has also forced the communities to explore innovative means of generating resources.

The willingness to form user groups, their receptiveness to inputs provided by the RDP, and exploration of ways and means of overcoming their resource constraints—all indicate that user groups and local NGOs have the potential to be sustainable. These groups also create their own funds, either through users' charges or through monthly saving schemes, and have their own rules and regulations, which are sure signs that these groups are emerging as permanent institutions. Many of them have also registered themselves as NGOs in the District Administrative Office and have their own bank accounts.

There was also some indication, however, that certain groups, especially in the agricultural sector, had not yet consolidated themselves. These groups tended to come

together only to receive inputs from external agencies. In one case, a single group of women had formed two groups to receive input under two different programs. The women's group (called the coffee planters groups) had to form a separate group under the terms of the Micro-Credit Program. The same set of women had therefore officially formed themselves into a credit group as well as a coffee planters group. In so doing, they had reduced their monthly contribution of Rs 20 initially made to the coffee group to Rs. 10 and had begun contributing the Rs 10 to the account of the credit group.

The dexterity with which the women's group responded to the needs of the program reflects their desire to be involved in the various programs in their area. Many households were also cross-members of different types of groups, as is necessary to maintain the complex farm system. Cross-membership needs to be monitored, however, to prevent the duplication of inputs such as training and tours and to ensure that coverage is not restricted to a few individuals. Local NGOs could be encouraged to improve their skills and could then be entrusted with the responsibility for furthering people's involvement.

## **POLICY**

The Rapti Development project is an action program for the Rapti Zone. Nevertheless, it has had a number of policy effects and provides the basis for many policy recommendations. With a more specific mandate on policy issues, it could have had a substantial effect on policy debates.

### **Private Enterprise**

The RDP promotes income-led activities such as the production of high-value crops and the initiation of market links through "workshops" that bring farmers and traders together to interact. These activities are part of a producer-driven and market-led model of development. The RDP's emphasis on private enterprise has also led to extensive private initiatives in input marketing. It has supported farmer efforts to adopt technologies that depend on the timely supply of agricultural inputs. Private enterprise activities have been greatly stimulated by the construction and maintenance of roads. The message is clear: the private sector would respond to expanded production and marketing activities if public investment was directed toward the development of infrastructure (such as rural roads) and public policies facilitated private activities. The liberal economic policies of the government at about the time that RDP's operation plan was formulated helped speed up its implementation.

From the beginning, the RDP helped farmer groups plan and implement agricultural production activities from the bottom up. It also facilitated alternate delivery mechanisms (for example, via local firms) to obtain, demonstrate, and disseminate improved crop technologies. Mustard and potato are examples.

The prerequisites of successful private enterprise are also illustrated by the less successful cases. The RDP's effort to motivate private entrepreneurs to embark on

marketing milk has met with limited success. Although private entrepreneurs are involved in marketing milk, they have not been able to establish the business firmly because the market is so distant and producers do not have the facilities to ensure the speedy delivery of milk in the early mornings and to keep the milk chilled. These problems call for a feasibility study to evaluate the prospects of a livestock-based product industry in the region.

### **Group Approach**

As noted earlier, the RDP has consistently emphasized and promoted the participation of farmers' groups in the planning and implementation of production and marketing activities. This has always been a bottom-up operation. The importance of such operations has become quite clear, as have the requisites to their success. In the successful cases, farmers saw the groups as a means of earning short- or long-run cash income or generating assets. User groups have been highly successful in forestry, soil conservation, livestock, horticulture, and other areas. And although some user groups have failed, in each case it has been because the farmers did not perceive increased cash income or asset building as flowing from the group.

The RDP has not only demonstrated the importance of user groups but has also shown how they can be organized and nurtured most effectively. Their use for extension messages and for developing market information and power are but two examples of the valuable functions they perform. The sources of success and the importance of continuity in line agencies are illustrated by the livestock experience. One of the vital steps in the RDP case was to initiate livestock development through the farmer group and then to generate and mobilize local resources through group savings funds, seeds/seeding production, drug shops, and basic animal health services available through animal health workers. In the initial stage, the RDP concentrated its energies on mobilizing local human resources by encouraging the farmers to organize themselves into groups and launch production, management, and service programs through these groups.

At a later stage, the monitoring of the livestock production was reduced because of a disruption in the continuity of service provided by the DADO's office. This was found to be mainly due to the reorganization of the Ministry of Agriculture/DOAD/DADO's office and to the loss of experienced temporary staff, along with the transfer and new recruitment of field workers. Another reason was that a remote district like Rukum was unable to recruit technical staff just before the election, although the DOAD had given it the authority to recruit the staff by itself. The position has still not improved. The RDP has also benefitted from the experience of Palpa and Makhanpur community forestry and fodder development program, through the user groups. The RDP has capitalized on this experience and conducted species introductory trials under the pine forest, sal/broad-leaf forest, and subwatershed management areas through the officers of the DFO and DSCO. The success achieved in the RDP zone stands out as a fine example of local resource generation and human resource mobilization for other projects to follow.

The training provided to the user groups enabled them to formulate an operational plan, and the annual budget and planning reviews promoted transparency and forged a consensus. User groups that have become accustomed to this sort of collective endeavor are likely to continue along these lines in the future.

### **Local Government**

Although the RDP has been forced to operate within the limits of national policy, its activities have had some side effects on that policy. The RDP's efforts in the five districts of Rapti Zone have been viewed positively by the politicians, administrators, and the people. The effort put into institutional development, in particular, has set a standard for the government, especially the MLD, to emulate in other parts of the country. According to MLD officials, the unique feature of RDP is its SCDP and development of private entrepreneurship.

The RDP has made some headway in establishing linkages between the farm producers and the private sector. In the opinion of the MLD, such linkages need to be developed elsewhere, and they envisage the VDCs and DDCs as the catalyst. The SCDP has provided the scope for action and for the utilization of RDP training by making resources available through a 50 percent matching fund to local institutions. Funds are to be utilized in accordance with the guidelines set out by the MLD and RDP. This experience will be used to establish similar guidelines for grants to VDCs throughout the country.

Local government institutions in the Rapti Zone are said to function better than anywhere else, and the RDP model could therefore be replicated in other regions. In particular, local institutions in Nepal have had difficulty making full use of the services of the line agencies and coordinating these agencies. The RDP experience has shown that with proper information and knowledge the DDC can bring about such coordination. And the approach used to develop and strengthen the local institutions can put pressure on the line agencies to obtain satisfactory services.

The training that the RDP provides for the staff of the line agencies—in creating a data base, mobilizing user groups, and assessing community needs through RRA and PRA techniques—has encouraged them to feel at ease in dealing with communities and catering to their needs. Great value has been placed on the technical assistance that the RDP provides to local institutions because obtaining such assistance has been a persistent problem for local institutions throughout Nepal.

MLD, the evaluating team was told, is planning to establish a technical unit at the district level by pooling unused manpower from other agencies and is also planning a series of training sessions to strengthen the capabilities of local organizations. Nevertheless, it appears that the RDP would still be expected to provide technical training to the line agency staffs in the area, since such training has motivated the staff and improved their capacity to serve the people. At the same time, the RDP will probably continue to provide technical assistance for local planning and encourage people to reach a consensus on how to promote realistic planning and how to resolve their

problems. No doubt it will also continue to promote the development of technical, managerial, and financial management capabilities.

RDP's efforts at institutional development have been viewed in a positive light. Some of the approaches adopted are being emulated by the MLD. The experience gained, especially by the LDO through the SCDP, can be expected to be used in other districts of Nepal.

The guidelines prepared by the RDP/MLD to facilitate the proper utilization of resources, has had its effects on the subsequent guidelines issued for the Rs 300,000 grant awarded to the VDC. Although the subsequent guideline makes no mention of the need to come up with a matching fund, it is envisaged that the DDC and the will both play a role. The new grant provided to the VDC is expected to build confidence in the local institutions and to promote the planning process at the people's level. The process of empowering the local institutions has been initiated and will likely continue. The MLD will no doubt make use of the lessons learned from RDP in this process.

The institutional development efforts, although they show positive signs, still have some way to go. The SCDP, which has provided meaningful scope for action to the local institution, is of recent origin. The training coverage has not yet been wide enough to incorporate sizable numbers of the local institutions. Assessments of training needs and criteria for the selection of trainees are yet to be made. The data base also has to be refined and the local institutions still have to be able to update the data base in a timely and regular manner.

Since the technical assistance and the training currently being provided by the RDP will have to be transferred to local agencies during prewithdrawal phase, it may be advisable to select and prepare such agencies to carry on these functions in the future. The RDP may target the proposed technical assistance unit and the training units of the ministries to strengthen their capacity. Local NGOs could also be used to provide technical assistance and training, especially to the user groups.

### **Democratic Institutions**

The RDP model of agricultural development services, privatization, and institutional development seems to have progressed at a faster pace since the "operation plan" was announced in 1991, a year before multiparty democracy was restored in Nepal. The democratic environment seems to have boosted that progress. The RDP's achievements now need to be refined and incorporated into the government's agricultural policy in order to sustain and replicate the RDP achievements in a significant way.

As already pointed out in this report, the RDP's achievements provided a base for producer-driven and market-led agricultural policy. The implication is that under a democratic setup the government should now concentrate more attention on policy formulation, on monitoring and evaluating policy implementation, and on providing the appropriate economic and infrastructural environment for the private sector enterprises and farmers' organizations to respond to various economic stimuli led by the market. A 1992 study by IIDS entitled "Rural Services Delivery Review" and a more recent study,

"The Role of Government in Agriculture Research and Extension," also arrive at similar conclusion supporting the experiences gained under the RDP.

### **Extension**

Several policy lessons emerge from the success of the RDP's extension effort. First, the key to success is to clearly define extension objectives. The RDP emphasized activities that dramatically increased farmers' cash income or asset positions. Second, initial efforts should be concentrated on places where success is likely to be achieved. This is known as "the pocket approach." At the same time, there should be a careful selection of commodity priorities. Third, extension need not be the monopoly of the public sector. Private enterprises and farmers' organization can be effective alternative institutions for promoting production and marketing activities. In addition, they release public sector resources for their more important function: to support policy formulation, monitoring and evaluation, research and training, quality and standard enforcement, infrastructure development, the direct implementation of activities for small and marginal farmers, and women's activities.

Of course, private and user group organizations may also complement public extension programs. The RDP agricultural effort was designed to help increase farm productivity and income. The strategic concentration on cash crops, including potato and mustard, and the demonstration of the effectiveness of improved location-specific technologies showed farmers and extension workers a way to achieve the RDP goal.

### **Horticulture**

The horticulture aspects of the RDP confirm the efficiency of policies that emphasize pockets of development, the importance of roads to horticulture, the interactions with consuming centers, specialization in line agencies to improve technical quality, the potential of line agencies, private sector cooperation, and the critical role of user groups in increasing the efficiency of extension and other delivery systems.

### **Livestock**

The success of the RDP's livestock efforts further confirms the efficiencies to be obtained by forming user groups. It also demonstrates the potential for expanded private sector effort (including veterinary services); the importance of village workshops; the importance of integrating livestock, soil conservation, and forestry efforts; the critical importance of improved fodder production; the need to expand national markets through increased per capita income if the livestock sector is to meet its potentials; and the development of localized animal breeding centers.

Some of the lessons, such as the importance of markets and the solution to the fodder problem, are reflected in the general decline of large animals in the zone and the rise of small animals. Small-scale milk- and meat-processing industries are established in the region. This calls for a feasibility study to promote the establishment of a livestock-based product industry. In other words, future efforts should focus mainly on developing markets and a marketing system, along with fodder and feed programs.

### **Forestry**

The forestry program in Rapti has demonstrated that user groups can be formed much more rapidly than was generally thought in the past. The DFO's and DSCO's decision to allocate more time to community forest activities than budgeted and the VDC's commitment to become significantly involved have greatly contributed to what has been done to date.

That success has provided a role model for other regions, and in turn has influenced and speeded up the passage of new forestry legislation.

### **Soil and Water Conservation**

The RDP's highly successful soil and water conservation efforts have demonstrated that soil and water conservation can be integrated with forestry, agriculture, livestock, and other rural sector activities; that conservation user groups can be formed and can function effectively if they focus on short-term benefits like fodder along with the long-term benefits of trees, increased water availability, and reduced siltation; and that soil and water conservation activities can be introduced through entry points of urgent local demand, such as drinking water, farm/livestock ponds, and irrigation. If their results are to be effective, it is also necessary for soil and water conservation activities to follow an integrated approach in geographically focused areas of a micro- or subwatershed. It is possible to make the soil and water conservation package sustainable if the benefits from the program are marketed properly not only among the people within the watershed but also among those outside, including the downstream communities.

### **Monitoring, Evaluation, and Policy Focus**

The RDP could have had a far greater policy impact if it had introduced a more analytically oriented monitoring and evaluation component, directed toward drawing policy conclusions from the project's inputs and outputs. A policy analysis approach would have provided a more detailed factual basis for support of the policy implications stated above. It would also have brought to light and facilitated the policy impact of the project in additional areas.

**For example, the project could easily have turned up detailed information on fertilizer demand and supply problems that could have helped bring an early improvement in the Agricultural Inputs Corporation and its relationship to the private sector. Similarly, an immense amount of factual information could have been brought to bear on the roads debate. The Dang Valley experience could have contributed to a better understanding of groundwater needs and its potential. It is strongly recommended that project extensions incorporate the analytical capacity for drawing and substantiating such policy recommendations.**

## PROJECT DESIGN

This project was put together in 1978-80 when it was standard policy to design integrated development projects with a multisectoral approach to rural development. It was customary to identify targets for each component and have the components implemented by a line agency or the NGO. The components were to be coordinated by the party chief and his Nepali counterpart. It was a top-down management style.

It was acknowledged, almost two decades ago, that integrated development is a complex process. The conventional wisdom was that it would be a mistake to scale down to a less complex approach. That argument has proven correct. Incorporating people's participation into a growth strategy and shifting to self-reliance mechanisms is a complex process. It takes time to bring about decentralization and to gain the self-confidence needed to make a break with the past. It takes even more time to shift from a subsistence level of living to one that generates enough income to enable people to purchase their year-round food requirements and to revegetate landscapes vulnerable to erosion that support downstream users.

Designers of the RDP were visionaries, and the truth of their vision has been proven. Yes, there were stumbles. It took longer than expected to set the infrastructure in place. It took time to have resource managers make the transition from working with people rather than directing them. It took time to persuade farmers that it does make good sense to consider high-value crop production. The road system had to be put into place. And most important, the country's leadership had to provide the policy mechanisms that would allow change to occur.

Throughout Nepal in the 1970-80s, the Nepalese and expatriates alike went through an intense learning process in projects similar to the Rapti Integrated Development program. Phase I blazed a trail in an era when the "Green Revolution" was a slogan and the difference between social and community forestry was being debated and seminars were being held throughout the world on how best to obtain people's participation.

The final evaluation for Phase I (October 1985) critically concluded that the project was too complex and disparate and that its components remained separated rather than linked and focused. The evaluation also pointed out that a sound foundation for future agricultural growth had been achieved. Most significant, Phase I substantially strengthened district and village capacity to plan and manage resources. At the same time, on the natural resources side, the USAID Institute of Forestry was beginning to

time, on the natural resources side, the USAID Institute of Forestry was beginning to graduate natural resource managers with a broader outlook. The learning curve of integrated rural development had peaked out.

The final evaluation of 367-0129 recommended that a second phase be implemented with the emphasis on building local institutions and transferring technology in agriculture and the environment. This would be done by (a) continuing Phase I support to strengthening district and village institutional capacity, (b) expanding and strengthening the natural resource management program, and (c) concentrating on agricultural production in the valley and hill areas. The project was renamed the Rapti Development Project number 367-0155; the term "integrated" was dropped. Activities like health and family planning, building construction, and cottage industries were not continued.

Although several nonproducing interventions were terminated, Phase II nevertheless remained a complex program with 14 local support interventions, four expatriate and local contracting firms, participant training, and evaluation and special studies. The technical analysis (January 1991) prepared by Devres/New Era after Phase II acknowledged that the Rapti Zone farming systems are intricate and interact in complex ways with forest, water, livestock, and grazing. The sociocultural pattern was wide-ranging. Access to markets was varied. The curve of introducing change began to rise again.

The midterm evaluation led to a recommendation that the project focus more sharply on improving productivity and increasing household incomes by helping farmers adopt new technology (a Phase I priority). In emphasizing and encouraging farmer innovation to improve productivity and increase household income there, would be a new orientation to pricing and markets.

Several recommendations were made to this end: reintroduce family planning; increase the focus on women; be more market-led and producer-driven; develop market activities; base on-farm development initiatives on rigorous technical and financial analysis; ensure that development initiatives are individually and fully supervised; and refine and use the analytic framework of the midterm report.

Priority was to be given to turning forests over to communities; vegetable and potato development; the introduction of legumes; small surface irrigation projects; the distribution of improved cockerels, bucks, and roes; the freeing up of trade in fertilizers; expansion of the area under modified taunge; milk industry development; continued support to the entrepreneurship program; community fuelwood and fodder-tree plantation; establishment of a self-help fund; support to farmers to start private nurseries; development of goat production; use of ADBN credit; greater emphasis on specific sites; better animal health delivery; pig cross-breeding at the village level; dairy buffalo upgrading; and veterinary services to migration/sheep flocks.

The coordination and administration of implementing and integrating the modifications was given a boost by the democratization movement of 1990. In forestry, for example, the Forestry Act 2050 (1993) provided the key to handing forests over to FUGs. This report brings the 15-year history up to date. The project has been effective. It has incorporated people into the decision making process and strongly influenced the self-reliance envisioned in 1979-80. The pendulum is swinging away from subsistence

level farming toward marketing surplus products. There is no question that the environment has been enhanced with the gains made in establishing community forests and the works of the DSCWM. Women are greatly involved at all levels. Access roads are supporting both the import and export of goods and services.

The individual sections of this report describe in detail how the RDP has been effective in paving the way for the peoples of Rapti and Nepal to enter the twenty-first century. Each section examines whether project interventions are sustainable or need to be modified to be sustainable. There has been a remarkable impact on the people and the bureaucracy of Nepal's government agencies. They want to ensure that what has been put in place is carried on.

## BUDGET HISTORY

Phase I of RDP (No. 367-0129) had a planned funding level of US\$33.0 million. From 1981 to 1985 the total USAID and HMG expended funds were US\$18.9 million. Phase II (No. 367-0155) has a planned life-of-project budget of US\$29.3 million, which includes AID bilateral funding, Peace Corps, and HMG Nepal. Tables 6-14 and 6-15 summarize the expenditure levels by expenditure categories (367-0155) and program activities (367-0129).

Because of different bookkeeping and reporting procedures over the total project period, it is difficult to capture comparable data for each phase and category. For example, Phase I reported in both rupees and dollars, and the exchange rate varied. In Phase II there was no tracking of specific activities, except by Devres/New Era during the last several years. Therefore, only general comparisons can be made for Phase I. More specific inferences can be made for Phase II.

The data in table 6-15 provide information on total expenditures (USAID plus HMG) for Phase I activities, while project 367-0129 was not uniformly reported compared to 367-0155 (table 6-14). The data do not permit gross inferences. Four program areas captured the most funds during Phase I: roads, project coordinator's office, and agricultural credit/small farmer development program, and office and other buildings. The expenditure for forestry was about one-half that allocated during Phase II, which indicates the change in the direction of Phase II. Other activities—such as livestock, horticulture, and soil and water conservation—also received increases in Phase II compared with Phase I, but the increase was not as great as that for forestry.

Phase II is more sharply focused with fewer subactivities. Table 6-14 shows that technical assistance (local groups, Devres/New Era, and evaluation/special studies) amounted to 26 percent of the project input as compared with about 31 percent during Phase I. Part of the reduction is attributed to Devres/New Era not fielding full time TA for the last several years. The party chief makes periodic visits to check on and resolve issues. Within the costs for local support, roads still captured the most funds at 19 percent, followed by agriculture and forestry at 12 percent each, livestock at 11 percent, the local development office at 10 percent, soil conservation at 9 percent, the small farmer development programs at 7 percent, and the project coordination at 5 percent. Self-help, women's development, horticulture, ADBN and irrigation, and the agricultural input corporation received lesser amounts.

USAID should install a procedure for tracking activity allocation and expenditures. This will give a clearer picture of what is being done throughout a project.

USAID should install a procedure for tracking activity allocation and expenditures. This will give a clearer picture of what is being done throughout a project. Devres/New Era has constructed a computerized program for this purpose that is readily transferable.

Table 6-14. Cumulative Rapti Development Project Financial Status, 1994

Expenditure category	Accrued expenditures (thousands of US\$)								
	Life of project budget		PMTa	After midterm			Total	Percentage	
	Amount	Percentage	1987/88	1991/92	1992/93	1993/94	Amount	LOP	Line Item
<i>Technical assistance</i>	-	-	-	-	-	-	-	-	-
Devres/New Era	4,646	25	2,045	818	837	457	4,152	89	-
<i>Local/groups/Private</i>	2,954	16	1,083	486	478	333	2,380	81	-
No-Frills (VFC/Animal)	-	-	-	-	-	-	609	-	26
NCBA	-	-	-	-	-	-	815	-	34
CARE/Nepal	-	-	-	-	-	-	956	-	40
<i>Evaluation/Sp-studies</i>	850	5	475	79	15	50	619	73	-
Participation training	1,160	6	460	164	127	290	981	85	-
Commodities	700	4	498	-	99	40	637	91	-
<i>Local/support Costs</i>	7,908	42	3,583	868	633	798	5,882*	74	-
Agriculture	-	-	-	-	-	-	703	-	12
Livestock	-	-	-	-	-	-	638	-	11
Horticulture	-	-	-	-	-	-	109	-	2
Forestry	-	-	-	-	-	-	733	-	12
Soil conservation	-	-	-	-	-	-	509	-	9
Roads	-	-	-	-	-	-	1,146	-	19
LDO/other	-	-	-	-	-	-	588	-	10
LDO/self-help	-	-	-	-	-	-	208	-	3
Women's development	-	-	-	-	-	-	198	-	3
PCO	-	-	-	-	-	-	296	-	5
Agriculture input	-	-	-	-	-	-	30	-	< 1
SFDP	-	-	-	-	-	-	439	-	7
ADB-ATU/PEU	-	-	-	-	-	-	210	-	4
ADB/irrigation	-	-	-	-	-	-	75	-	1
Subtotal	18,218	-	8,084	2,415	2,189	1,963	14,651	80	-
<i>Site core program</i>	582	3	-	-	-	-	-	-	-
Subtotal	18,800	69	8,084	2,415	2,189	1,963	14,651	78	-
<i>Local currencies</i>	-	-	-	-	-	-	-	-	-
GON	8,613	31	3,223	819	611	657	5,310	62	-
Total		100		3,234	2,800	2,670	19,961	73	-

Note: PMT = Pre-mid term. Detailed expenditures on subactivities have not been kept, therefore, only total amounts are available.

a. Sum of subitems does not total 100 because of rounding.

Source: USAID/Nepal Project Office.

**Table 6-15. Summary of Rapti Zone Rural Area Development Project Expenditures, Phase I**

Program Activities	Expenditure (in thousands) <sup>a</sup>			
	Rupee		U.S. Dollar	
	Amount	Percentage	Amount	Percentage
Agricultural extension	6,916	86.8	-	-
Nepalgunj training center	115	1.5	-	-
Horticulture	930	11.7	-	-
Total	7,916	-	-	-
Livestock	7,509	-	500	-
Forestry	5,400	4.3	-	-
Soil conservation	4,766	-	-	-
Agricultural credit	14,640	-	-	-
Agriculture input corp.	3,686	-	-	-
Medium irrigation	-	-	2,143	-
Rural women/HPS	2,000	-	-	-
Roads	51,523	-	-	-
Road stabilization	-	-	2,500	-
Rural small works	-	-	2,070	-
Office and other buildings	-	-	4,000	-
Appropriate technology unit	3,290	-	-	-
Cottage industry	4,400	-	-	-
Service centers	-	-	507	-
Education	-	-	400	-
Health and family planning	n.a.	-	-	-
Project coordinators office	41,200	-	-	-
Technical assistance	-	-	3,173	-

a. Data were not reported uniformly. These data should only be used for a general comparison of the funds allocated to the various activities.

## CONCLUSION AND RECOMMENDATIONS

THE RDP has been a diverse project, with many components that may be viewed from several points of view. Thus, the main body of this report is organized around the project's outputs and inputs, both institutional and physical. The executive summary is organized around the major objectives of development realized by the project. This concluding section is organized around sectors related to line agencies, in order focus on the lessons of the RDP regarding the improvement in line agency performance. Of course, it recognizes that further assistance to the line agencies can improve performance and treats that aspect as well.

The main components into which the RDP has evolved over the past decade and a half have proved to be central to the strategic priorities delineated in the APP. The RDP has demonstrated how to succeed in key technical areas and in the institutional requisites of larger success.

High-value commodity production is central to the hills strategy of the APP. The RDP has proven the success of this strategy and has raised second-generation issues. Hence it is vital for the USAID to play a leadership role in the donor community in helping Nepal to finally get onto the growth track essential to solving the immense and growing social problems of the hills. Community forestry is also central to the APP hill strategy, and again the RDP has shown how to solve the first-generation problems, has raised the second-generation problems, and is poised to play a key role as Nepal accepts this priority and tries to push on. Democratization has been less central to the RDP in expenditure, but the key to implementing the critical road priority for the APP is to build the local democratic institutions that are the cutting edge of democratization in Nepal at the present time. Grass roots democratization can only be built in the context of providing what people want. The RDP has provided the environment and then pushed on to developing the most forward-looking local government institutions in Nepal. The opportunity is now there to play a vital role in this critical area in the context of APP-driven growth.

## **INSTITUTIONAL DEVELOPMENT**

The RPD's efforts toward institutional development have been received positively by all the members of the permanent institutions. The project has promoted coordination among the institutions, promoted the exchange of views and experiences. In particular, the periodic review of budget and plans has facilitated transparency and enhanced knowledge. The introduction of SCDP in 1992, in particular, has provided resources to encourage locally initiated development activities promoting the formation of more user groups to some extent has helped strengthen the DDC-VDC linkages. In all, the RDP through its institutional development efforts seems to have initiated a process that has all the symptoms of being sustainable. The use of village profiles, formation of operational plans, and orientation toward local needs are some of the features that can be sustained in the future. However, there is scope for improvement in the institutional development effort, as the local institutes are far from confident in their tasks.

### **Recommendations**

1. The line agencies and USAID should give more attention to the formation of user group to ensure they are homogeneous in terms of their socioeconomic status and to prevent differential benefits from going to people of different status.
2. The perception that RDP's contribution in SCDP (Self-Reliant Community Development Project) is just another budgetary allocation should be discouraged. And the SCDP funds should be channeled toward promoting self-reliance among the communities in future.
3. RDP efforts to develop VDC and user-group linkages are weak, not only with respect to forestry and soil/water conservation but even in the drinking water and minor irrigation activities, where subsidies are provided. However, such ties can perhaps be strengthened if USAID can link technical and financial supports to VDC and user groups with respect to the recently introduced HMG program, "Build Your Own Village," for which Rs 300,000 has been allocated to each VDCs. In the course of this strengthening, perhaps USAID/HMG can also solidify the DDC-VDC relationship. The UG-VDC-DDC-HMG relationship should be strengthened as well, through cost and revenue sharing among all the local institutions and national government. Such an arrangement will enhance transparency, along with cooperation and accountability among the government agencies.
4. In consonance with recent changes providing grants to VDCs directly via the LDO, USAID/HMG should undertake activities to enable the VDCs to utilize the grant money fruitfully. And they should promote inter-VDC planning processes and enable the DDCs to coordinate such inter-VDC activities.

5. To strengthen the DDCs/VDCs, local demands must be reflected in the sectoral plans of the line agencies, but this can only be done to the extent that local bodies can reduce their dependence on the line agencies in formulating plans. This will promote the LDO's coordination role by formulating interagency plans rather than just compiling the sectoral plans provided by the line agencies. HMG/USAID should empower the local representative bodies by institutionalizing the SCDP model and thereby strengthening the bottom-up planning process.
6. Since the coordination between line agencies is facilitated by regular budget and plan review workshops such as those conducted by the PCO, these workshops should be institutionalized by HMG/USAID, before the RDP is phased out.
7. The effort to empower the user groups, by enabling them to obtain the assistance and services from the line agencies and to control their own resources, should be expanded to include newly formed groups under the SCDP in areas beyond those targeted by the RDP during the second phase.

### **LOCAL INVOLVEMENT**

User groups have made it possible to involve people in the development process. The group approach has enhanced the capacity of the line agencies to provide better services and has enabled people to receive better inputs. People have participated in the development process not only through their user groups, but also through their local NGOs. Local involvement has also promoted support activities through the sectoral transfer of funds within the communities. Involvement of the people through people's organizations is assuming permanent features which will promote the process of democratization. However, not all such organizations are fully capable of addressing development issues and therefore require assistance to increase their capacity and resource base.

#### **Recommendations**

1. The cross-membership of individuals between different types of groups is necessitated by the farm system in which they make their living. The possibility of duplication in these groups, though it encourages involvement in multiple activities, needs to be monitored to prevent the duplication of inputs such as training and tours to ensure that coverage is not restricted to a few individuals.
2. Local NGOs should be encouraged to become further involved by enhancing their capacity and entrusting them with the responsibility to promote people's participation. NGOs engaged in self-reliant development and local group mobilization

through credit and saving schemes such as the RSDC (Rural Self-Reliant Development Centre) and IIDS could be used to strengthen the user group.

3. The involvement of the poor farmers requires special attention. Training and program packages specially designed for the poor. They should be of low risk, have a low resource base, and be conditioned on thorough need/capability assessment studies.
4. The involvement of women needs to be expanded through WDOs and NGOs to find ways to enable them to control resources, especially in forestry.

## **FORESTRY AND SOIL CONSERVATION**

### **Forestry**

The Rapti Zone has an estimated 539,982 hectares of forestland. Not all this land is considered accessible for handover to communities. Furthermore, not all of the land judged accessible should be placed in community or private hands. It is important, in the hills and mountains, to have the high-risk and strategically located lands administered by the HMG for all of the people. National forests need to be preserved for the country's economic, social, political, and environmental security.

Although the primary infrastructure to sustain a community forest program is in place, there are gaps that will lead either to a status quo position or cause a return to overexploitation if they are not attended to. It is not a simple question of handing forests over to communities; it is a matter of knowing how to manage them responsibly.

The RDP has not focused on private, national, or leasehold forests, marketing, or manufacturing of forest/wood products. There is not much information on biomass production, although the RDP has established trial plots to begin data collection. There is no clear understanding of how the income from forest products should be mobilized or used in terms of revenue sharing. There is a lack of monitoring objectives, and a host of forest management constraints.

Confidence has been instilled in the people and line agencies of the Rapti Zone, as compared with other districts. However, the confidence is shallow when it comes to understanding interlinked forest ownership patterns and how to interlink wood product markets. Training is needed to instruct users in the technology of plantation management versus the natural forest. Research in support of extension has not been strong. Technical backstopping for community resource development that supports the groundswell establishment of community forests is not in place. For example, DFOs visit forestry groups in the hills and mountains less often than in the terai.

There is some concern about the technical backstopping available to support the self-help promotion fund that will be given to Village Development Committees. The technology curve has flattened out. DFOs are pointing out that they are neglecting the

administration and management of national forests. At the same time, FUGs say they are prepared to hire foresters and consultants to advise them on how to manage and market their forest products.

The marketing of high-value agricultural and wood products have been identified as a high priority in steering the next phase of the Rapti into the twenty-first century.

### **Recommendations**

1. The boundaries of community, national, private, leasehold, and special forests must be delineated. These forests require different management prescriptions and have separate purposes. Demarcation will eliminate the perennial issue of where forests are located, who is responsible for their management, and which ones are accessible and which are not. Such a survey should be given the highest priority and should make use of Geographical Information Systems by the project and concerned HMG departments.
2. All FUG forest management plans should be updated with annual allowable cut information to ensure that these stands are not exploited beyond their potential to produce a sustained supply of wood (see recommendation 5).
3. A wood product marketing and manufacturing activity must be started. FUGs are now cutting timber for the local market, but some is being transported to outside markets. The activity should include processing, milling, storage, grading, drying, marketing potential, and prefabrication of house components and the manufacturing of finished products such as quality doors, window frames, and furniture. This priority activity should be undertaken with technical assistance.
4. A revenue-sharing schedule from the different forest categories should be established, on the basis of results from recommendations 1 and 2. The lead for this should be the Ministry of Forests and Soil Conservation and appropriate revenue-setting agency.
5. A team of U.S. Peace Corps volunteer foresters should be fielded to help FUGs update the annual allowable cut information in the existing 326 management plans (see recommendation 2). This work should be carried out under the guidance of a technical assistant or a consultant with experience in preparing small woodlot management plans and with the help of private Nepali foresters. Nepali foresters do not have experience in small woodlot management planning and marketing. The TA could be scheduled part-time rather than full-time.
6. HMG/USAID should support the strengthening and expansion of training in FACT and community plantation planning for all FUG members; small woodlot management and marketing for private consultants; adaptable silvicultural technology

for all wood workers; the use of modern wood harvesting and manufacturing equipment for wood workers; and programming, budgeting, and planning for FUGs to ensure that they are financially responsible with the funds collected from the sale of products. The training could be undertaken by the PCO and Institute of Forestry.

7. Mechanized wood harvesting and milling equipment should be installed. Chain saws and powered sawmills are a necessary step to upgrading wood operations and producing quality wood products. Support for this activity should be provided in association with recommendation 3.
8. Forest research of the HMG and the Institute of Forestry should assist in uncovering the best management practices for FUG forest management. This information should be practical and useful as extension tools.

### **Soil Conservation**

The RDP soil and water conservation program in the Rapti Zone is gaining public appreciation because of its visible results demonstrated in the Narayanpur-Perini area, particularly in the concentration of activities in three subwatersheds in each of the five districts. Accordingly, many CUGs have been formed, and they are adopting soil and water conservation measures rapidly. Consequently, the quantity and quality of the soil and water conservation work are being enhanced in Rapti, but not in other districts in Nepal. Appropriate soil and water conservation measures are extremely important in all geographic locations of Rapti Zone because they enhance land-use productivity, water source development and utilization, and the protection or stabilization of roads and trails. To some extent, these measures are also necessary to ameliorate environmental tasks, such as torrent and flood control.

### **Recommendation**

1. The Rapti soil conservation program should be expanded by the DSCO in order to consolidate technoeconomic conservation works together with participation by individual households, groups, villages, and local government institutions. The expansion of the Perini model should cover the entire natural watersheds of Hapur Khola above the point of Duruwa, which includes not only the Perini and Patrephalne streams but also Chauhuwa, Sangram, and Khar Khola, and many other unnamed subsidiary streams. The experience gained so far indicates that the DSO should also train the concerned groups and individuals to become "machine operators" in planning and executing a holistic watershed management program in the entire expanded area. Then HMG should extend the complete Perini "model" to similar

geophysical locations within Dang and Deukhuri valleys, and then after to other Dun valleys in Nepal.

2. Aerial photographs and maps should be acquired and used to update/prepare detailed land-use maps at a scale of 1:50,000 (for general planning), 1:20,000 (for individual sub-watershed planning) and 1:10,000 for implementation at the micro- and subwatershed levels.
3. The various kinds of soil and water conservation works in the hills and mountains are still fragmented and isolated without much of the synergy that can be derived from such work. Therefore, it is necessary to consolidate them on geographically focused micro- and subwatershed in a time-phased manner with technical assistance from USAID/HMG line agencies. It is also necessary to intergrade this program with forestry and other natural resource management sectors.
4. Soil and water conservation work, especially grass, shrub, and tree planting for the prevention/control of splash, sheet, hill, gully, torrent, and landslide problems cannot be carried out successfully without the participation, as well as "ownership," of the local people in general and women in particular. Women should be empowered to internalize the benefits. This should be continued by DSCO, along with the WDO.
5. HMG should develop and facilitate a system of sharing soil and water conservation benefits and burdens among various groups and local governmental levels in a just and equitable manner. A means of sharing the cost and benefits of conservation between up- and downstream communities should also be found, either directly among user groups or through cost and revenue sharing. Also the existing UG-VDC-DDC-HMG linkages in forestry and soil conservation should be strengthened. Such an arrangement will enhance transparency in conservation as well as in the marketing of forestry goods.
6. HMG/USAID should increase the present program/budget level (about Rs 1 million per district) by three to five times in order to achieve a strong impact on soil and water conservation in Rapti.

## **AGRICULTURE**

Agriculture has been vital to the RDP strategy of responding to the expressed needs of user associations, and the project's success in agriculture has been critical to the success of user groups as democratic institutions. The strategy has done particularly well in vegetables, fruit, and cash crops. The critical issue now is to spread the strategy from the pockets to the rest of the zone, to Nepal more generally, and to increase Nepal's capacity to provide the technical production and marketing inputs. There has also been some success in other areas that provide useful lessons for Nepal as it pursues the APP, but that may not merit high priority in future project activities.

## **Horticulture**

The technology for producing high-value off-season vegetable crops, vegetable seeds, and apples has been intensively and successfully implemented in different pockets of the project area. But production alone does not guarantee full benefits to the producers. This should be accompanied by the concurrent development of marketing outlets, transportation facilities, collection centers, and storage spaces. In general, markets for horticultural products do exist in both Nepal and abroad, but organized marketing with price information and wholesale and retail mechanisms and frequent contacts between the producers and traders need to be developed further. These should be emphasized in the future. A newly established Marketing Association in Jinabang has helped the local farmer groups to satisfy some of the needs.

Quality control is an integral part of any production system. In the absence of a stringent quality control mechanism, any production system is bound to collapse. Adequate attention has not been paid to maintaining the quality of the vegetable seeds produced in the pocket areas. This deserves immediate attention.

No-Frills, a private company, has been effective in implementing the production program in a limited area. Ways and means should be sought to extend the successful production program and organized marketing facilities to other pocket areas as well.

The introduction of improved cultivars of vegetable seeds is vital to enhancing productivity in the pocket areas. Although the use of hybrid seeds is also responsible for this enhancement to some extent, this should not be encouraged for some time until technologies have been developed to produce the inbred lines locally, with the collaboration of NARC.

## **Recommendation**

1. The VFC program has benefitted farmer producers, traders, women, and unemployed people immensely, but this program needs to be reinforced and further strengthened and expanded. The USAID/HMG should assist in activities that will promote marketing and agribusiness enterprises. In the light of such a strengthened and expanded program, the possibility of establishing agribusiness enterprises should be explored, for which the services of a marketing expert is needed. The cost is to be borne by the USAID/HMG.
2. In order to replicate the model developed by No-Frills in other potential pockets of the district government, agricultural development agencies at the district level should work out a program with the support of local consultancy firms that is certain to be implemented. The USAID/HMG should support the cost of the services of the consultants.

3. **The specialized and commercialized production of high-value cash crops needs the services of a specialist in vegetables, apples, and citrus fruits. The DOAD must provide for the services of these specialists in such potential pocket areas.**
4. **In support of the production aspects, organizations such as NARC can and must play a critical role. NARC's help is greatly needed in matters pertaining to the techniques for developing soil fertility, integrated pest management, the availability of high-quality foundation seed, and the varietal improvement of fruits (apple, citrus, etc.). It is crucial for the NARC scientists to visit the project area farmers and their fields if they are to carry out on-farm research.**
5. **The project successfully accomplished vegetable seed production in the area. This activity needs to be encouraged in the future. However, attention must also be paid to maintaining standard seed by supplying good-quality foundation seed, maintaining proper isolation distance among cross-compatible species, providing proper cultural practices and plant protection measures. Internal and external markets are to be explored following the expansion of the seed production program. To meet these requirements, it is also necessary to pay some attention to postharvest technology, especially drying, threshing, precleaning, and grading. A small precleaner needs to be maintained in the project area with the USAID/HMG's support for the use of seed producers.**
6. **The production of fresh vegetables has increased substantially since the introduction of hybrid vegetable seeds. It was observed that hybrid seeds are being imported every year. However, this practice needs to be discouraged if the local seed industry is to be sustained. Since the demand for hybrid seeds is increasing in the country, they hybrid seed production program should be given close attention at the national level. It is suggested that NARC should give due consideration and attention to this matter.**
7. **The incidence and infestation of pests and diseases must be closely monitored, especially when farmers are aiming for the commercial production of vegetables and vegetable seeds. The DOAD needs to provide plant protection services in the area on a regular basis.**
8. **The production of high-quality, disease-free, and true-to-the-variety plants is of utmost necessity. Private nurseries need regular contact and supervision in order to strengthen and upgrade their capacities. Improved apple rootstock needs to be encouraged to upgrade the quality of apple plants in the private nurseries. To this end, the USAID/HMG should ask Lumle Agriculture Center to distribute mother Malling rootstock, which could be multiplied by private nurserymen with little training. Apple plants raised on Malling rootstocks will have the desired height and bear high-quality fruits quite early.**

## **Field Crops**

In the wake of the "operational plan" of 1991, the project seems to have succeeded in guiding limited resources into geographic sites with good potential. Dang and Salyan district, in particular, have received a greater concentration of project efforts in developing a producer-driven and market-led resource management model. Farmers from specific sites with assured irrigation have received the benefits from adopting high-yielding technologies. The model has been gaining the attention of farmers in other areas, particularly in the foothills and riversides of other hill districts. In Dang Valley, however, poor access to irrigation access, uncertain land tenure, and poor roads further restrict the spread of innovation.

Although relatively loose in contrast to other groups, crop farmers have been found to be active and united in groups receiving extension training and demonstration inputs support from different project actors, including the line agencies. But, individual members of the group appeared to be left alone in marketing surpluses or seeds of cereal grains, potato, and mustard. RDP success, particularly in potato and mustard, however will need time to spread. It also requires improved irrigation, road infrastructure, land tenure, and market access. The promotion of nonfarm enterprises, as strongly recommended by midterm evaluation, also remains to be vigorously pursued in the future activities.

RDP seems to have demonstrated an alternative mechanism for research, extension, and market delivery other than the traditional government sources to the farmers. Government institutions can henceforth concentrate more on the relevant generic roles and also lead the activities of other partners in meeting the demands of the market.

The gap between the NARC and farmers, as indicated by the case of the improved potato introduced by the project advisers, needs to be closed from the long-term sustainable point of view. The possibility of sharing agricultural research activities with private and other nongovernment institutions seems to be the new opening with the experience of RDP.

## **Recommendations**

1. In view of RDP's concern with setting clear goals, the strategic concentration of activities and resources under participatory management needs to be further refined and replicated in other parts of the country under the managerial leadership of line agencies. The line agencies should improve their capability to perform their own role efficiently and also monitor the roles played by the various nongovernment institutions to ensure the competitive delivery of quality services to the farmers. USAID/HMG support for improving managerial capability of line agencies would be critical in this direction.
2. USAID/HMG should support the expansion of an irrigation facility, particularly in Dang Deukhuri to expand the adoption of high-yielding varieties and replication of

the RDP model of field and cash crops. A massive investment in shallow tubewells, and deep tubewells, where feasible, should be the new direction towards improvement of the irrigation constraint in Rapti.

3. It is also suggested that in the next step an analysis be done on the present state of the art of agricultural marketing processes and institutions from a new perspective that could relate it to the world market. It means understanding buyers, what they really need and designing a system to support producers and marketers in meeting those needs. It is a challenging process, but the world will not wait for those who start late. The line agencies should be reoriented along marketing lines on the basis of the study on the new marketing concept. The marketing study be carried out by a consultant from the project fund before it is phased out.

### **Livestock**

Livestock raising can become a major source of family income and can improve the socioeconomic status of the farmers, provided the overall livestock management system is up to competing in the open market. The fodder seed production, together with the community forestry, subwatershed, and on-farm programs, need to be expanded massively in order to improve the feed deficit situation in the zone, and also to reduce the cost of production of livestock products to increase the competitive edge of the local produce. This will improve the environment by increasing the ground cover under the forests and the buildup of soil-fertility by introducing fodder legumes under forest plantations.

The way to make the livestock groups sustainable, especially small farmers' and women's groups, depends on how they are linked with marketing opportunity and easy access to credit and services and their involvement in the management of local resources. A basic approach to managing livestock groups to ensure that they are sustainable has been initiated in the project areas but still has a long way to go before the groups are self-reliant.

The Dangapari goat breeding society needs continued support from DADO, LDD, and NARC to maintain the production and productivity standard of its crossbreeds and to establish itself as a breed, also to support the local resource generation policy of the DOAD. Likewise, the Barbari goat has demonstrated its potential to establish itself as a suitable breed for raising under stall feeding with a cut-and-carry fodder management system. Barbari goat production has to be promoted with more on-farm fodder production by the DOAD. Furthermore, crossbreeds of Barbari and local goats will prove to be a better breed for generating income among small farmers, especially women.

The farmers will realize the benefits of the crossbreed provided they have good market outlets. Further program expansion is directly linked with the expansion of the milk market. The pockets of Ghorahi and Tulsipur in Dang and Deukhuri valleys, Sari/Rijuwar area (Pyuthan), Libang area (Ropla), and Chaurjahari Kholagaon-Musikot

tract (Rukum) should be recognized and supported as a major breeding tract or resource center for the Rapti Zone.

The potential of Pakhribas black pig is well established and its market is ensured. DADO's office, Dang, must give urgent attention to ensuring a continued supply of foundation males and females from Pakhribas with special arrangements to maintain the production standard of this breed at the village level.

The involvement of the farmers in the identification of their own problems, causes, solutions, responsibilities, and miniproject planning process through village level workshop and DAP has just been developed and established in small areas. The model developed by the RDP still needs to be supported as it is not mature enough to sustain itself. The livestock production and animal health unit within the DOAD's office should be motivated and supervised to be involved in group promotion programs to provide appropriated technology package to different socioeconomic groups in different target areas.

### **Recommendations**

1. Farmers of the user groups should be provided with adequate training to improve the production of quality seeds and to undertake fodder seed production as a rural enterprise by the DADO's in active collaboration with DFOs and DSCOs in of each districts in the Rapti Zone, starting with Dang. The establishment of a fodder seed producer's association should be encouraged to organize the marketing of seeds produced in each district by the concerned line agencies and to link it up with local and overseas marketing agencies in the future.
2. The USAID, Danish International Development Agency, and the Nepal Dairy Development Board should support the expansion of the milk collection network and processing facilities of the Dairy Development Corporation and the private dairies to increase their milk handling and processing capabilities and to diversify the production of milk products in the country. This will provide a better opportunity to expand the markets for milk produced by the farmers of the Rapti Zone. as well as of other commercial areas, especially along the major highways and link roads. Furthermore, Nepal Dairy Development Board of HMG should discourage heavy importation of the milk powder by the dairies to promote the expansion of a milk production network within the country.
3. The livestock production groups should be involved and supported in the management of resources, marketing of their farm/forest products, management of basic animal health and plant protection services, and supply of basic inputs and consumer goods through the joint effort of the DADO, DFO, and DSCO in each district to build up the ability to manage resources.

4. **The DADO's office should encourage livestock groups and entrepreneur farmers to grow more fodder for the lean seasons, especially during the winter and summer months, in order to bridge the gap between the seasons for milk production and also to help bring down the cost of milk and meat production by reducing the use of expensive concentrates. This will improve producers' competitive edge in the market and increase returns as well. The administration of balanced feed, fodder, and minerals by all farmers according to the needs of the high-producing animals, especially in the commercial areas, has to be promoted vigorously in the coming years.**
5. **The concept of a balanced farming system based on traditional technology and knowledge, using intercrop fodder legumes with food crops, fodder shrubs on the terrace banks, trailing fodder legumes, and grasses on terrace risers in combination with multipurpose fodder trees, medicinal plants/herbs, firewood and timber should be adequately tested through the collaboration of NARC, forestry research, and DOAD, especially in the hills of the Rapti Zone.**
6. **The Ghorahi area (Dang) and Deukhuri Valley, Sari-Bijuwar area (Pyuthan), and Libang (Rolpa) should be declared market areas for breeding buffalo and should be supported by the DOAD and the ADBN. The DOAD should advise ADBN to relax the policy of purchasing buffalo from India to promote the development of local markets for breeding animals.**
7. **The DOAD should help expand the breeding tract for the Dangapari goat beyond the limit of Deukhuri Valley toward the Kusum area of Banke district. Similarly, the present breeding areas for Pakhribas black pig should be recognized by the DOAD and declared a major resource center for black pigs, especially for the midwest development region of Nepal. The NARC and DOAD should provide the continuous technical support needed to expand the breeding and production areas for black pigs.**
8. **The RDA and the DOAD should provide policy guidelines for institutionalizing the process of people's participatory planning process by enhancing the use of village workshops and the district agriculture planning process focused especially on rural women and poor farmers right through the inception period to the implementation phase. This will develop their skills to participate in the decisionmaking process and to implement production programs more effectively for their benefits.**
9. **The DOAD, through its training centers, should organize regular training on group mobilization, participatory planning, and technology advancement to build up the capabilities of the field-level officers and medium-level technicians to mobilize farmer groups in the best possible ways. A regular annual district workshop is a must to monitor and support the groups to make them self-reliant and to back them up with an incentive mechanism developed by the DOAD.**

10. The DOAD and the RDA should make sure that the technical units within the DADO's office have ample autonomy and authority to run their programs by themselves. Furthermore, the technical manpower shortage in all districts should immediately be addressed by the DOAD and the RDA of the midwestern development region.

### **OTHER ISSUES**

A few other points can be made concerning the second-generation issues that have emerged as consequence of the RDP's initial success.

#### **Project Design**

The project as a whole has achieved its goal. Nevertheless, some activities or parts of activities have not fared as well as others.

#### **Recommendation**

1. There must be a Phase III to ensure that the path of environmental improvement is well founded, the impact of democratization is working, hill farmer incomes are increased, women are at the forefront of development, and the health of families is provided for.
2. The next step is to ensure that the critical mass of community forestry and high-value cash crops are prepared to make the quantum leap to the twenty-first century.

#### **Evaluation and Special Studies**

RDP/PCO have an impressive store of information and data generated during the project implementation period. Macro-studies, as well as periodic studies of the component programs of RDP, have been utilized to improve the effectiveness of RDP interventions either in whole or in the concerned programs. However, there is scope for better utilization of other types of data.

#### **Recommendation**

1. The impressive store of useful data, especially those generated through experimental reports, and the periodic data collected by PCO, would be useful for dissemination if efforts were made to compile them systematically on a regular basis. After this, an effort would have to be made to disseminate such information. This would

facilitate the use and replication of the RDP approach in other areas and parts of the country.

2. To improve the system of collecting such data, the Monitoring and Evaluation Unit may require a technical adviser and special training for the monitoring personnel.
3. Data should be refined and upgraded to make them suitable for analytical use to inform policy.
4. Such monitoring and evaluation data could be linked with data related to the various interventions, their duration of impact, and their effects. These data could be compared for target areas, populations, and larger areas of the district, Ilakas, or village so as to provide meaningful information on the progress of the RDP areas in relation to their surrounding areas. Efforts to posit and depict such data in a comparative framework with different pockets of intervention could also be useful for measuring the relative progress of the areas of intervention.
5. Thus far, little has been done to evaluate soil/water conservation specifically under the RDP. Therefore, some studies should focus on both the technoeconomic and the sociomanagerial aspects of conservation in general, with special reference to soil and water conservation. Such studies and assessment should be made for each of the physiographic regions under consideration.
6. One conspicuous deficiency is the lack of working maps and aerial photographs in the soil and water conservation program. They could be used effectively in assessing, planning, programming, and implementing the soil and water conservation program.

### **Participant Training**

Training, tours, and review meetings facilitated the participatory approach adopted by the RDP. This approach has enhanced the capabilities of local institutions and people. There is still scope for further refinement and consolidation.

### **Recommendation**

1. The RDP should encourage the line agencies and the local institutions to make sufficient and regular budgetary allocation for training of the type facilitated by RDP.
2. Steps should also be taken to make greater use of the line agency staff with trainer's training and to institutionalize activities within the development bureaucracy.

3. In the prewithdrawal phase, the RDP should explore ways of handing over its training functions to permanent training institutions to ensure the continuity of its efforts. Training units of the concerned ministries could be targeted for this purpose.
4. HMG/USAID should assist DDC/VDC in providing training opportunities to all the elected members including the future incumbents of VDC/DDC. This will ensure adequate opportunities and better utilization of the trainings provided.
5. Village-level workshops have been successful in involving more participants at a low cost. Such field-level training should be continued and increased.
6. A greater effort should be made to increase the participation of women and the poorer sections of society.
7. The knowledge and skills obtained by members of the user groups have been used only to a limited extent. Farmer-to-farmer training has not been widely practiced in the RDP areas. Efforts to remedy this limitation should be made.
8. The training needs of different groups and institutions should be assessed and the training designed to meet the subsequently emerging needs, such as those of marketing, the harvesting of forests, organizational management, long-term planning, utilization of resources at hand, and technical and financial management.
9. Objective criteria for the selection of trainees should be developed to ensure wider coverage and proper utilization of the training.

### **Marketing**

The RDP has demonstrated the producer-driven and market-led model in improving farm and forest productivity. Specifically, it has introduced "workshops" for producers and traders to internet and develop trading relationship. The emphasis should now be on expanding this activity and initiating the concept of "marketing" as a process rather than the traditional trading activity. Consequently, Nepalese producers will benefit by being able to serve the needs of high-quality product markets. As a result of the RDP achievement, marketing has emerged as a single overriding concern.

### **Recommendations**

1. An interim investigation should be implemented to explore new markets, outside of India, to identify those quality markets that have the potential to absorb the kinds of vegetable, fruit, and wood products being promoted throughout Rapti. This investigation should include priority recommendations and ideas on utilization, marketing, and packaging that could have some bearing on the next phase. It is

suggested this could be accomplished by a consultant from existing project funds before the project is closed out.

## **Roads**

The project has developed a mechanism and basis for guiding future activities in improving and maintaining rural roads. The idea of connecting production pockets by motorable roads has helped break the tradition of DOR's involvement only up to the district headquarters. Furthermore, with the stimulation of agricultural activity, rural roads have become critical to marketing. In fact farmers mention road as the number one priority for future action. The present state of transport infrastructure should therefore be improved to stimulate the growth of the scattered mountain niches connecting them with the main road. However, support for such rural roads needs to include environment-friendly measures.

## **Recommendation**

1. HMG/USAID should consider investing more in rural roads. Line agencies should use their coordination role to persuade people to participate in sharing costs in the involvement in production and marketing activities.
2. In the future, the construction and improvement of rural roads should include environment-friendly measures in the terms of reference of road engineers and contractors. This work should be ensured by the DOR and it also should prevent hewing on the hillsides and throwing the spoil downhill, as is being practiced in the hill areas at present.

## REFERENCES

- Achet, Shiva H., and Sam Cooper. 1992. *Operation Plan of the Soil Conservation and Watershed Management Program of RDP*. Nepal.
- Agricultural Projects Services Centre. 1990. *Household Income Survey, Integrated Rural Development Project, Rapti. Vol I and II (Annex)*. Kathmandu, Nepal: Final Report APROSC.
- Agriculture Statistics Division. n.d. *Agriculture Statistics of Nepal 1987-88*. Kathmandu, Nepal: Ministry of Agriculture.
- \_\_\_\_\_. n.d. *Agriculture Statistics of Nepal, 1992-93*. Kathmandu, Nepal: Ministry of Agriculture.
- Bashyal, Hari Prasad. 1994. *Samudayik Brikchharopan Yojana Tarjuma Prakriya Niradeshika*. Tulsipur, Dang, Nepal: Devres/New Era, Rapti Development Project.
- \_\_\_\_\_. n.d. *Silviculture Programs for Community Forest Management*. Tulsipur, Dang, Nepal: Devres/New Era.
- \_\_\_\_\_. 1993. *Community Plantation Planning System Guideline*. Kathmandu, Nepal: New Era.
- Basyal, H. P., and S. N. Tiwary. 1992. *Forestry and Communication Training for Rangers. An Assessment Report*. Kathmandu, Nepal.
- \_\_\_\_\_. n.d. *Forestry and Communication Training for Ranger and Assistant Rangers*. Tulsipur, Dang, Nepal: Devres/New Era.
- CARE/Nepal. 1994. *Project Implementation Report, Small Farmers community Project*. Tulsipur, Dang, Nepal: Rapti Development Project.
- \_\_\_\_\_. 1995. *Balimpur (Rampur) Irrigation Project*. Tulsipur, Dang, Nepal.
- \_\_\_\_\_. 1995. *Bauhara Irrigation Project*. Tulsipur, Dang, Nepal.
- \_\_\_\_\_. 1995. *Ghodmare (Kavre) Irrigation Project*. Tulsipur, Dang, Nepal.
- \_\_\_\_\_. n.d. *Kanjuwar Irrigation Project*. Tulsipur, Dang, Nepal.
- \_\_\_\_\_. n.d. *Kashipur Irrigation Project*. Tulsipur, Dang, Nepal.
- Chaudhary, Shiva Kumar 1994. *A Report on Large-plot Potato Demonstration*. Tulsipur, Dang, Nepal: Devres/New Era.
- \_\_\_\_\_. 1994. *A Report on Technical Feasibility Study of Cumin in Rapti Zone*. Tulsipur, Dang, Nepal: Devres/New Era.
- \_\_\_\_\_. 1994. *A Report on Large-plot Mustard Demonstration*. Tulsipur, Dang, Nepal: Devres/New Era, and Rapti Development Project.
- \_\_\_\_\_. *A Report on Farmers Managed Maize Seed Production*. Tulsipur, Dang, Nepal: Devres/New Era.
- \_\_\_\_\_. 1994. *A Report on Large-plot Niger Demonstration*. Tulsipur, Dang, Nepal: Devres/New Era, Rapti Development Project.

- \_\_\_\_\_. 1994. *A Report on Large-Plot Potato Demonstration*. Tulsipur, Dang, Nepal: Devres/New Era.
- \_\_\_\_\_. 1994. *How to Conduct Village Level Workshops. A Users Manual for the District Agriculture Development Office Working Draft Manual*. Tulsipur, Dang, Nepal: Devres/New Era, Rapti Development Project.
- Chaudhary, Shiva Kumar, and Ashok Poudyal. n.d. *Gaon Stariya Yojana Tarjuma Gosti Sanchalan Nirdeshika*. Tulsipur, Dang, Nepal: Rapti Development Project.
- DAI/IDA/GEOCE. 1990. *Rapti Development Project: Mid-Term Evaluation, Final Report*. Kathmandu, Nepal: USAID.
- \_\_\_\_\_. 1994. *Rapti Development Project, Midterm Evaluation Final Report*. Kathmandu, Nepal: USAID.
- Devres/New Era/USAID. 1994. *Performance Report for the Agriculture Sector RDP*. Kathmandu, Nepal: Agricultural and Rural Development Office/USAID.
- Devres/New Era/Winrock. 1993. *Self-Help Performance Fund Operational Guidelines*. Tulsipur, Dang, Nepal: Rapti Development Project.
- \_\_\_\_\_. 1993. *Ghee Intervention Feasibility Study*. Tulsipur, Dang, Nepal: Rapti Development Project.
- Devres/New Era, CARE/Nepal, No-Frills. 1993. *Annual Progress Report, Nepali Fiscal Year 2049/50*. Tulsipur, Dang, Nepal: Rapti Development Project.
- Devres Inc. 1991. *Integrated Technical and Economic Appraisal for the Rapti Development Project*. Bethesda, Maryland.
- \_\_\_\_\_. 1991. *First and Second Quatermester Progress Report, 2047/48 and Third Quatermester workplan 2047/48*. Tulsipur, Dang, Nepal: Rapti Development Project.
- \_\_\_\_\_. 1992. *First Quatermester Progress Report, 2048/49 and Second Quatermester Workplan, 2048/49*. Tulsipur, Dang, Nepal: Rapti Development Project.
- \_\_\_\_\_. 1994a. *Pig Breeding Resource Centre (A Feasibility Study)*. Tulsipur, Dang, Nepal: Rapti Development Project.
- \_\_\_\_\_. 1994b. *First Quatermester Progress Report, 2050/51 and Second Quatermester workplan, 2050/51*. Tulsipur, Dang, Nepal: Rapti Development Project.
- Devres/New ERA/Winrock/CARE-Nepal/No-Frills and National Co-operative Business, Associate. 1990. *Annual Progress Report 2046/47*. Tulsipur, Dang, Nepal: Rapti Development Project.
- Devres/New ERA/Winrock/CARE/N., No-Frills and National Co-operative Business Association. 1991. *Annual Progress Report, (2047/48)*. Tulsipur, Dang, Nepal: Rapti Development Project.
- Devres/New Era, CARE/N and No-Frills. 1994. *Annual Progress Report Nepali Fiscal Year 2050/51*. Tulsipur, Dang, Nepal: RDP.
- Devres/New Era. 1994. *Second Quatermester Progress Report, 2050/51 and Third Quatermester Workplan, 2050/51*. Tulsipur, Dang, Nepal.
- Devres/New Era. 1993. *Rapti Development Project. Annual Progress Report Nepali Fiscal Year 2049/50*. Tulsipur, Dang, Nepal: RDP.
- Devres Inc. 1993. *Second Quatermester Progress Report, 2049/50 and Third Quatermester Workplan, 2049/50*. Tulsipur, Dang, Nepal.

- Devres/New Era/Winrock. 1992. *Livestock Operational Plan for the Rapti Development Project (2049/50 and 2051/52)*. Kathmandu, Nepal.
- Devres/New Era. 1994. *Goat Breeding Resource Centre (Feasibility Study)*. Tulsipur, Dang, Nepal: Rapti Development Project.
- Devres/New Era. 1994. *Performance Report for the Forestry Sector (NFY 2044/45 through Nepali Fiscal Year 2050/51)*. Tulsipur, Dang, Nepal: RDP.
- Devres/New Era. 1994. *Performance Report for the Livestock Sector (Nepali Fiscal Year 2044/45 through Nepali Fiscal Year 2050/51)*. Tulsipur, Dang, Nepal: RDP.
- Devres/New Era. 1994. *Performance Report for the Agriculture Sector (Nepali Fiscal Year 2044/45 through Nepali Fiscal Year 2050/51)*. Tulsipur, Dang, Nepal: RDP.
- Devres/New Era/Winrock. 1991. *Integrated Technical and Economic Appraisal for the Rapti Development Project*, Kathmandu, Nepal.
- Devres/New Era/Winrock. 1992. *Agricultural Operational Plan for R.D.P.* Kathmandu, Nepal.
- Devres/New Era. 1994. *Village Level Workshop: A Users Manual for the District Agriculture Development Office*. Tulsipur, Dang, Nepal: RDP.
- Devres/New Era. 1994. *Performance Report for the Soil Conservation Sector (Nepali Fiscal Year 2044/45 through Nepali Fiscal Year 2050/51)*. Kathmandu, Nepal.
- Devres/New Era. 1992. *An Assessment of Murrah, Crossbred and Local Buffalo in Dang*. Tulsipur, Dang, Nepal: RDP.
- Devres/New Era/Winrock. 1993. *Lessons Learned from a Model for Bottom-up Development*. Tulsipur, Dang, Nepal: RDP.
- Devres/New Era. 1992. *Ghee Intervention Feasibility Study*. Tulsipur, Dang, Nepal: RDP.
- Devres/New Era/Winrock. 1988. *Livestock Sector Analysis and Operation Plan for the Rapti Development Project*. Tulsipur, Dang, Nepal.
- Devres/New Era/Winrock. 1994. *Performance Report for the Livestock Sector (Nepali Fiscal Year 2044/45 through Nepali Fiscal Year 2050/51)*. Tulsipur, Dang, Nepal: RDP.
- Devres/New Era/Winrock. 1994. *Mini Report on Milk Supply to Tulsipur Market*. Tulsipur, Dang, Nepal: RDP.
- Devres/New Era/Winrock. 1991. *Milk Processing and Marketing Management: A Recommended Option for Livestock Development in Rapti*. Rapti Development Project. Tulsipur, Dang, Nepal.
- Devres/New Era. 1994. *Rapti Development Project: Annual Progress Report*. Tulsipur, Dang, Nepal: RDP.
- District Agriculture Development Office. 1994. *Annual Report, 2050/51*. Ghorahi, Dang, Nepal.
- District Agriculture Development Office. 1994. *Annual Report, 2050/51*. Khalanga, Pyuthan, Nepal.
- District Agriculture Development Office. 1994. *Annual Report, 2050/51*. Khalanga, Salyan, Nepal.
- District Agriculture Development Office. 1994. *Annual Report, 2050/51*. Libang, Rolpa, Nepal.

- HMG/USAID. 1995. *Feeding Dairy Animals in Nepal Dairy Enterprise Support Component of Agro-Enterprise Technology System Project*. Kathmandu, Nepal.
- HMG-DSCWM. 1992. *Soil Conservation and Watershed Management Activities (Definition, Objective, Scope and Working Strategy)*. Kathmandu, Nepal.
- HMG-Ministry of Forest and Soil Conservation. 1988. *Main Report Soil Conservation and Watershed Management Plan: Master Plan for the Forestry Sector*. Kathmandu, Nepal.
- HMG-WECS. 1986. *Land use in Nepal- A Summary of the Land Resources Mapping Project Results*. Kathmandu, Nepal.
- Local Development Training Centre. 1994. *Production Credit for Rural Women in Rapti Zone: An Evaluation*. Nepalganj, Banke, Nepal.
- Local Development Training Centre. 1993. *Impact Study of Technical and Rural Communication Training in Dang, Salyan and Pyuthan*. Nepalganj, Banke, Nepal.
- Nepal Agricultural Research Council and Agro Enterprise & Technology Systems Project. 1994. *A Six Monthly Progress Report of the NARC/ATSP Activities for the Period January-June 1994*. Khumaltar, Lalitpur, Nepal.
- No-Frills Consultants. 1992. *Terminal Report, Vegetable, Fruit, Cash crops Program components of Rapti Development Project*. Tulsipur, Dang, Nepal: RDP.
- \_\_\_\_\_. 1993. *Vegetable, Fruit and Cash Crop/Animal Program Component of R.D.P. Annual Work Plan 1994*. Kathmandu, Nepal.
- \_\_\_\_\_. 1993. *Vegetable, Fruit, Cash, Crop/Animal (VFC/A/Program) Annual Progress Report*. RDP. Tulsipur, Dang, Nepal.
- \_\_\_\_\_. 1993. *Vegetable, Fruit, Cash Crop/Animal (VFC/A) Program of RDP: Annual progress Report (October 1992-June 1993)*. Tulsipur, Dang, Nepal: RDP.
- \_\_\_\_\_. 1993. *Vegetable, Fruit and Cash Crop/Animal program component of Rapti Development Project, Annual Work Plan 1994*. Tulsipur, Dang, Nepal.
- \_\_\_\_\_. 1994. *Vegetable, Fruit, Cash Crop/Animal (VFC/A Program) Annual Progress Report*. Tulsipur, Dang, Nepal: RDP.
- Pokharel, C. P., and R. B. Shrestha. 1994. *Agricultural Statistics, Revised Cropped Area Series (1974/75-1991/92)*. National Planning Commission, Kathmandu, Nepal.
- Poudyal, Ashok, and Stuart S. Demanski. 1992. *Rapid Assessment of the Modified Taungya Program in Dang District*. Devres/New Era/Winrock, Kathmandu, Nepal.
- Pradhan, B. R. 1994. *CARE/Nepal Project Implementation Report—Small Farmers Community Project*. CARE, Lalitpur, Nepal.
- RDP. 1993. *Annual Progress Report (Nepali Fiscal Year-2049/50)*, Tulsipur, Dang, Nepal.
- \_\_\_\_\_. 1994. *Annual Progress Report (Nepali Fiscal Year-2050/51)*. Tulsipur, Dang, Nepal.
- \_\_\_\_\_. 1994. *RDP-Annual workplan and Budget 2051/52*. Rapti Development Project, Tulsipur, Dang, Nepal.
- Shakya, Keshab M. 1992. *Guidelines for Operational Planning in Watershed Management at District Level in Nepal*. Food and Agriculture Organization Consultant Report. Kathmandu, Nepal.

- Shrestha, Kiran, and Sam Cooper. 1992. *Forestry Operational Plan for the Rapti Development Project, Devres/New Era*, Kathmandu, Nepal.
- Singh, Surya B. 1993. "Lessons Learned from Forage Development Programs from Rapti Development Project." A paper presented in the workshop on Pasture and Fodder organized by DOAD/USAID, Kathmandu, Nepal.
- Singh, Surya B. 1993. *"Best-Bet" Forage Trial in Rapti—Interim II*. Kathmandu, Nepal.
- \_\_\_\_\_. 1993. *Lessons Learned from Forage Development Programs*. Rapti Development Project, Tulsipur, Dang, Nepal.
- Tulachan, P. M. 1994. *Promoting Agribusiness of High Volume Cash Crops/Commodities in the Hills/Mountains of Nepal—Opportunities and Constraints*. Technical Report, Series 3. USAID, Kathmandu, Nepal.
- Tulachan, P. M., and H. L. Shrestha. 1993. *A Success Story of the R.D.P—Vegetables, Fruit and Cash Crops Program*. Technical Report Series 1. Office of Agriculture and Rural Development/USAID, Kathmandu, Nepal.
- \_\_\_\_\_. 1994. *Improving the Agricultural Extension Delivery System in Nepal by Expanding the Role of Private Sector*, Technical Workshop Paper No. 1. USAID, Kathmandu, Nepal.
- USAID 1987. *A.I.D. Project No. 367-0155 - Project Grant Agreement between His Majesty's Government of Nepal and the United States of America for the Rapti Development Project*. Kathmandu, Nepal.
- USAID/HMG. 1994. Project Implementation letter No. 49.
- USAID/NEPAL. 1987. *Project Paper*. Kathmandu, Nepal.
- \_\_\_\_\_. 1994. *Briefing Book—Sustainable Income & Rural Enterprise (SIRE) Program (367-0167) Rapti Dev. Project (367-0155)*, Kathmandu, Nepal.
- \_\_\_\_\_. 1987. *Project Paper—R.D.P. (HMG Contribution)*, Kathmandu, Nepal.
- \_\_\_\_\_. 1994. *Sustainable Income and Rural Enterprise (SIRE) Program (367-0167) RDP. Briefing Book*. USAID, Kathmandu, Nepal.
- \_\_\_\_\_. 1994. *Country Report—Assessment of USAID Environmental Programs, Forestry and the Environment: Nepal case study*. Kathmandu, Nepal.
- Women Development Division. 1994. *Annual Progress Report 2050/51*. Khalanga, Pyuthan, Nepal.
- \_\_\_\_\_. 1994. *Annual Progress Report 2050/51*. Ghorai, Dang, Nepal.
- \_\_\_\_\_. 1994. *Annual Progress Report 2050/51*. Musikot, Rukum, Nepal.

## **Annex 1**

### **Evaluation—Scope of Work**

The final evaluation of the RDP is occurring seven years after grant agreement was signed. There remains nearly one full year of project implementation before closing out the project in August, 1995.

A 1990 midterm evaluation recommended that the overall RDP strategy should be modified in line with the project objectives and the district implementing agencies be guided by the operational plans, which emphasize those programs with good returns for sustained economic growth. Following the midterm evaluation, an integrated technical and economic appraisal study was carried out by Devres/New Era in 1991. This appraisal recommended that the RDP give highest priority to activities that are market-led and originate from Rapti people themselves, that is, producer-driven. It recommended that the project support to the line agencies should be focused on activities through which GON line agencies actively relinquish control of resources and move into the support role. Second, each of the key extension agencies—that is, agriculture, forestry, and soil conservation—should commit themselves to the operational plans identified and commit resources to priority activities during the remaining years of the project.

Therefore this final evaluation should critically examine the project in light of the three and half years of the project implementation since the RDP's project purpose was modified.

The evaluation team will review project plans, annual and periodic project reports, operational plans, special studies, and reports on specific components, and other relevant HMG reports and data. The team will visit field sites in the Rapti Zone and meet with contractors, grantees, GON officials, project beneficiaries and other involved in the process of RDP project implementation. Life of the project outputs is described in the Project Grant Amendment Annex, as amended through Project Implementation Letter No. 30. It is proposed that the evaluation be organized according to three major project output areas as specified below.

#### **Farm and Forest Productivity**

This includes (a) adoption of improved crop productivity technologies; (b) local management of improved cereal, horticulture and fodder seed; (c) increased area of cultivation, volumes of production, marketing and consumption of high-value low volume

cash crops; (d) increased group management of livestock productivity technologies and markets; (e) increased local management of forest resources through user groups.

### **Local Group and Private Enterprise Capacity**

This includes (a) active involvement of farmers in improved community resource management; (b) market-led entrepreneurial opportunities and microenterprise development; (c) management of forests, soil, and water resources through user groups; (d) participation of women in local development activities; and (e) small farmer development programs.

### **District Institutional Development**

This includes (a) collaboration between GON and local governments for sustainable development programs; (b) district officers effectiveness in planning, coordinating, and monitoring development programs; (c) rural construction programs such as district roads and farmer-managed small irrigation development; and, (d) self-help community development projects.

## **SPECIFIC RESPONSIBILITIES**

The team's primary responsibility will be to assess and analyze the RDP's performance (effectiveness in achieving results) with respect to the RDP's purpose and outputs. In addition, the team will review the RDP's progress toward the goal and its use of inputs. Specifically, the team will assess achievement of

- The project purpose: to increase household incomes and well-being through increased productivity and market access and improved sustainable management of farm and forest resource systems.
- Project outputs and their contribution to achieving the above purpose in three many results areas. They are
  - increased farm and forest productivity through improved technology and management, including crops, livestock, and forest resources;
  - increased local group and private enterprise capacity through active involvement of farmers in self-reliant development; and
  - District institutional development through more effective line agency (extension) programs and district and community governments.

The team will also assess how the various project inputs, including budget support for HMG line agencies, technical assistance, participant training, etc., have contributed to achieving the project outputs and purpose.

In addition to assessing the above components, the Evaluation Team shall address a number of cross-cutting evaluation issues which apply to all main result areas. These include:

- **Self-reliance, autonomy, and local involvement—Has the project helped significantly increase local self-reliance, autonomy, and capacity to evolve and sustain future development efforts?**
- **GON policies—Has the project contribute significantly to USAID and GON dialogue to improve development policies?**
- **Overall effectiveness—Did the project build effectively on the natural and institutional resource base to significantly improve the overall direction and the pace of development as was envisioned? Did the project take full advantage of the opening presented by the Nepal's new democracy?**
- **Project design and strategy—Did the project design and strategy contribute effectively to achieving the project purpose?**
- **Sustainability—What follow-on or phase-out programs or activities are required to ensure that sustainable development continues to evolve in the Rapti Zone?**
- **Is there evidence that the project has contributed to the increased cost-effectiveness in delivering development services.**

The evaluation team must examine the issues raised in the annex to the Attachment 1 in order to distinguish clearly between the evaluation findings, conclusions, recommendations, and lesson learned therefrom.

## **Annex 2**

### **Evaluation Team**

- 1. John W. Mellor, a policy analyst, is president of John Mellor Associates Inc. He was formerly director of the International Food Policy Research Institute, chief economist of the United States Agency for International Development, and professor at Cornell University. He is the author of numerous books and articles on agricultural policy and development, the recipient of the Wihuri prize (Finland), the Presidential Award (United States), and a fellow of several scholarly associations.**
- 2. Mervin Stevens is a forester and soil scientist with 20 years of international experience. He worked in Nepal from 1975 to 1980 for the Food and Agriculture Organization and USAID and has made periodic visits since then. He has taught community forestry at Kasetsart University, Bangkok, Thailand, and in about 25 countries.**
- 3. Narayan Regmi, an agricultural and management expert, is currently a research fellow at the Institute for Integrated Development Studies (IIDS) in Nepal. He was formerly chief of agricultural training of the Department of Agriculture Development; and deputy director, Nepal Administrative Staff College. Mr. Regmi has over 27 years of experience with government and nongovernment organization in the field of agriculture, management, and training and has consultancy experience in a wide range of activities in Nepal.**
- 4. Raman Raj Misra, is a social demographer, working as a research fellow at the Institute for Integrated Development Studies (IIDS). He was with the Local Development Training Institute of the Ministry of Local Development/Nepal. He has worked as a consultant and resource person for a number of agencies.**
- 5. Keshar Man Bajracharya, a forestry economist, is an academician/member of RONAST, where he is in charge of the forestry sector. He has worked in forestry and watershed management for 15 years with HMG/N and for 10 years in Suriname, Pakistan, and Bangladesh, on behalf of the Food and Agriculture Organization of the United Nations.**

- 6. Hari Prasad Gurung, a horticulturist with 31 years of experience in Nepal (1961-92). He was formerly director general of the Department of Horticulture, Ministry of Agriculture, Nepal, and was project manager in the formulation of Master Plan for Horticulture Development in Nepal.**
- 7. Shatrughan Lal Pradhan, is a livestock specialist with 30 years of experience in Nepal and abroad. He is the author of several books on livestock production in Nepal and has published several research papers in the national and international journals in animal sciences.**

## **Annex 3**

### **People Contacted**

#### **KATHMANDU**

**Amrit Lal Joshi, Director General, Department of Soil and Water Conservation, Kathmandu.**

**Bhola Nath Chalise, Secretary, Ministry of Local Development, Kathmandu.**

**Chakra Mehar Bajracharya, Under Secretary, Ministry of Local Development, Kathmandu.**

**Damodar Prasad Parajuli, Director General, Department of Forest, Kathmandu.**

**Harsha Bajracharya, Project Officer, USAID, Kathmandu.**

**Kailash Nath Pyakuryal, Member, National Planning Commission, Kathmandu.**

**Mohan Man Sainju, Executive Chairman, Institute for Integrated Development Studies, Kathmandu.**

**Pradeep Tulachan, USAID, Kathmandu.**

**Ram Prakash Yadav, Ex. Member, National Planning Commission, Kathmandu.**

**Roger Bloom, Deputy Chief, ARD, USAID, Kathmandu.**

**Shiva Bahadur Nepali, Executive Director, Nepal Agricultural Research Council, Kathmandu.**

**Shyam Lal Shrestha, USAID, Kathmandu.**

**Surendra Shrestha, Director General, Dept. of Agriculture Development, Kathmandu.**

**Uday Raj Soti, Joint Secretary, Ministry of Local Development, Kathmandu.**

## **DANG**

**Abdul Kayum, Secretary, Vegetable farmer Group Chailahi, Deokhuri.**

**Allen Turner, Devres/NEW Era**

**Ambika Prasad Upadhyaya, Member, Agriculture Development Committee, Thapgaon, Shrigaon VDC, Dang.**

**Arun Shukla, Sattya Trading, Tulsipur.**

**Ashok Paudel, M & E Advisor, Devres/NewEra**

**Asta Bhuja Chaudhary, Farmer (Potato seed Supplier).**

**B.B Gurung, CARE/NEPAL, Dang.**

**Babu Ram Bhadory, Guragaon, Dang.**

**Baidya N. Chaudhary, VFC Office, Tulsipur, Dang**

**Bal Dev Sharma, Thapgaon, Dang.**

**Bam Dev Sharma, Secretary, Pandaveshwor Buffalo Development Committee, Guruwagaon, Saundiyar VDC, Dang.**

**Basundhara Panthi, Housewife, Lila Dairy, Bharatpur, Ghorahi, Dang.**

**Bharat Nepal, Nepal Agri Centre, Ghorahi, Dang**

**Bharat Mani Sharma, District Development Committee, Dang.**

**Bharat Neupane, Member, District Development Committee, Dang.**

**Budhiram Basnet, Vice-Chairman, User's Committee, Narayanpur-2, Pereni, Dang.**

**Chet Bahadur Gharti, Water Users Committee, Ranagaon, Dang.**

**Chudamani Adhikary, Nabin Oil Industry, Lamahi, Deokhuri**

**Chulava Choudhary, Farmer, Thapgaon, Shrigaon VDC, Dang.**

**Damodar Sharma, Advisor, User's Committee, Narayanpur-2, Pereni, Dang.**

**Damodar Raut, Farmer, Buffalo Farm, Sisniya, Dang.**

**Damodar Regmi Sharma, Chairman, Syalapani Community Forest, Laxmipur VDC, Ward No. 9, Dang.**

**Devendra Man Shrestha, J.T., Agri. Development Office, Dang.**

**Dikpal Yogi, Chairman, Goat Breeding Centre, Nimbukut, Dang.**

**Durga Bahadur, Member, Agriculture Committee, Racchachour, Dang.**

**Ek Raj Sharma, Member, Pandaveshwor Buffalo Development Committee, Guruwagaon, Saundiyar VDC.**

**Gokarna Adhikari, Member, Guragaon, Dang.**

**Gum Prasad Chaudhary, Secretary, Pig Breeding Society, Dang.**

**Hari Narayan Chaudhary, Farmer, Buffalo Farm, Dang.**

**Hut Lal Kadhel, Farmer, Barhari Herel Dandukhuli, Dang.**

**Janak Bahadur Shah, ATU/ADBN, Tulsipur, Dang.**

**Janardan Sharma, Chairman, Thapagaon, Shrigaon VDC, Dang.**

**Jaya Shankar Lal, Project Manager, Ranagaon Irrigation Project, CARE/Nepal, Tulsipur, Dang.**

**Kausal Kishor Mahato, J.T.A. (Livestock), Agriculture Sub-centre, Sandiyar.**

**Keshav K. Sharma, Training Officer, PCO, RDP.**

**Khem Nath Yogi, Farmer, Goat Breeding Centre, Nimbukut, Dang.**

**Kul Prasad Chaudhary, Chairman, Pig Breeding Society, Dang.**

**Lilamani Sharma, Secretary, Goat Breeding Centre, Nimbukut, Dang.**

**Lum Bahadur Budathoki, Chairman, Pandaveshwor Buffalo Development Committee, Guruwagaon, Sandiyar VDC, Dang (He is also the Chairman of Pandaveshwor Community Forest Committee and Member of District Development Committee, Dang).**

**Madhup Dhungana, Devres/New Era.**

**Madhusudhan Upadhaya, Acting Project Coordinator, Project Co-ordination Office (PCO), Rapti Development Project.**

**Mahadav Prasad Shaha, Vice-Chairman, DDC, Dang.**

**Maya Sharma, Women Development Officer, Dang.**

**Members of Village Self-Reliance Committee, Narayanpur-2, Pereni, Dang.**

**Members of Chailahi Women Welfare Centre (Forest Group), Lamahi, Deokhuri, Dang.**

**Members of Women User's Committee, Narayanpur-2, Pereni, Dang.**

**Members of Community Environment, Youth Clubs, Narayanpur-2, Pereni, Dang.**

**Mithu Dhakal, Women Development Worker, Women Development Office, Contact Centre, Lamahi, Deokhuri.**

**Mohammad Roza, Fresh Vegetable Farmer, Lamahi, Deokhuri.**

**Mohammad Rojan, Farmer, Saundiyar VDC, Dang.**

**Mohammad Munir Khan, J.T., Balrampur, Chailahi, Deokhuri.**

**Mohan Nath Yogi, Member, Forest Users Group, Dang.**

**Nageshwar Prasad Gupta, Divisional Engineer, Department of Road Office, Ghorahi, Dang.**

**Narayan Prasad Chaudhary, Farmer, Tulsipur, Dang.**

**Nokhi Ram chaudhary, Farmer, Member, BASE, Chakhaura, Hekuli VDC, Dang.**

**Paan Bahadur Gharti, Computer Analysis, Devres/New Era, PCO, Dang.**

**Pima Thapa, Chairman, Bhavani Community Forestry, Shrigaon, Dang.**

**Poorna Bahadur Chaudhary, Member, BASE, Dang.**

**Prakash Bahadur Shah, Dealer, Agriculture Inputs Corporation Tulsipur, Dang.**

**Prem Oli, Assistant Horticulture Development Officer, Agri. Development Office, Dang.**

**Purna Bahadur Chaudhary, Farmer, Chakhaura, Hekuli VDC, Dang.**

**Pushkar Raj Acharya, Technical Assistant, DADO, Dang.**

**Puskar Yogi, Chairman, Agriculture and Forestry Development Committee, Thapgaon, Shrigaon VDC, Dang.**

**Puspa Rijal, Chairman, Ambikeswori Women Group, Dang.**

**Radheshyam Kumari, Farmer, Milk Chilling Centre, Lamahi, Deokhuri.**

**Raj Kumar Chaudhary, Member, BASE, Dang.**

**Rajendra Chaudary, JTA, Service Centre Tulsipur, Dang.**

**Ram Hari Pant, Assistant, Soil Conservation Officer, Dang.**

**Ram Pradash Chaudhary, Chairman, Buffalo Group Society, Dang.**

**Ram Pradash Lamichhane, Private Entrepreneur, Shreeram Dairy Enterprise, Dang.**

**Rasam Bahadur Khadka, Farmer, Tulsipur, Dang.**

**Roop Lal Chaudhary, Farmer, Chakhaura, Hekuli VDC, Dang.**

**Sagar Joshi, ATU Manager, ATU/ADBN, Tulsipur, Dang.**

**Shankar Bahadur B.C., Chairman, Village Development Committee (VDC) and Water User's Committee, Saundiyar VDC, Dang.**

**Shiva Kumar Chaudhary, Agriculture Extension Advisor, Devres/New Era.**

**Shiya Ram, Divisional Engineer, Road Division, Dang.**

**Som Nath Acharya, Watershed Management Area, Narayanpur-2, Pereni, Dang.**

**Subarna Man Chaudhary, VFC Office, Tulsipur, Dang**

**Sundar Prasad Chaudhary, Chairman, Agriculture Committee, Saundiyar VDC, Dang.**

**T. Dhaubhadel, Livestock Advisor, Devres/NewEra.**

**Tanka Bhatta, ATU/ADBN, Tulsipur, Dang.**

**Teeka Pradhan, Coordinator VFC Program, Tulsipur, Dang.**

**Tek Bahadur Chaudhari, Chairman, Vegetable Farmer's Group, Chailahi, Deokhuri.**

**Tirtha Raj Sharma Gyawali, Chairman, District Development Committee, Dang.**

**Tulsi Prasad Gautam, J.T., Agriculture Service Centre, Lamahi, Deokhuri.**

**Tulsi Ram Chaudhary, Chairman, The Agriculture Committee, and member, BASE, Dang.**

**Tulsi Ram Prchhai, Buffalo farmer, Saundiyar VDC, Dang.**

**Umesh Sharma, ATU/ADBN, Tulsipur, Dang.**

**Upendra Gautam, Profit Coordination Office, Tulsipur, Dang.**

**Vashu Dev Chaudhary, Member, Pig Breeding Society, Dang.**

**Vidya Nand Jha, J.T.A., Agriculture Sub-centre, Saundiyar.**

#### **PYUTHAN**

**Basanti Adhikari, Women Group Bhingri, Pyuthan**

**Bhagabati Khadka, Radish Seed Multiplication Farmer, Bijuwar, Pyuthan.**

**Bhim Bahadur Khadka, Radish Seed Multiplication Farmer, Bijuwar Pyuthan.**

**Bimal Shrestha, Small Farmer's Development Office, Pyuthan.**

**Bimala Sharma, Women Development Worker, Bhingri, Pyuthan**

**Binod Bharati, Site Engineer, MadiKhola Bridge Construction, Pyuthan**

**Bishnumati Vanjeri, Chairman, Swargadwari Goat Group, Pyuthan.**

**Biswo Raj Dotel, Local Development Officer, Pyuthan.**

**Biswo Raj Ghimire, Monitoring Officer, DDC, Pyuthan.**

**Bodh Nath Acharya, District Veterinary Officer, DADO, Pyuthan.**

**D.B. Bhandari, DDC, Pyuthan.**

**Deen Raj Pandit, Bijuwar, Farmer, Fresh Vegetables.**

**Deepak Raj Shrestha, Contractor, Madikhola Bridge Construction, Pyuthan**

**Dev Raj Gautam, Radish Seed Multiplication Farmer, Bijuwar Pyuthan.**

**Dhana Adhikary, Women Farmer Group, Bhingri, Pyuthan**

**Dharma Raj Bhandary, Member, DDC, Pyuthan.**

**Dhoj Bahadur Karki, Farmer Group, Bhingri, Pyuthan**

**Dil Bahadur Khadka, Sworgadwari Agro centre, Bijuwar,Pyuthan.**

**Durga Bahadur Karki, Farmer Group, Bhingri, Pyuthan**

**EK Raj Sharma, Farmer Group, Bhingri , Pyuthan**

**Gopal Raj Sharma, DDC, Pyuthan.**

**Gyani Karki, Women Farmer Group, Bhingri, Pyuthan**

**Hari Ram Bhatta, Cereal Crop Seed Multiplication Farmer, Bijuwar, Pyuthan.**

**Huma Karki, Women Farmer Group, Bhingri, Pyuthan**

**Jayeswor Karki, JT, Bijuwar,Pyuthan.**

**Jhabindra Paudyal, DDC, Pyuthan.**

**Karna Dhoj K.C., Chairman, DDC,Pyuthan.**

**Kheema Devi, Radish Seed Multiplication Farmer, Bijuwar, Pyuthan.**

**Kheli Prakash Regmi, Secretary, Buffalo Group, Pyuthan.**

**Khima Nanda Bhandari, Farmer Group, Bhingri, Pyuthan**

**Khimananda Adhikary, Secretary, Vegetable Group Nayagaon, Pyuthan.**

**Krishna Pokhrel, Chairman, Janajyoti Club, Bhingri, Pyuthan.**

**Krishna Bahadur Gurung, JT, Service Centre, Devasthan, Pyuthan**

**Kusal Subedi, Deputy Manager, Agriculture Development Bank Bhingri Pyuthan**

**Laxmi Prasad Rajbhandary, Chairman, Market Development Centre, Bijuwar, Pyuthan.**

**Madhav K.C., Vice Chairman, Community Development Centre, Pyuthan.**

**Manoj Shah, Soil Conservation Officer, Pyuthan.**

**Maya Adhikary, Women Farmer Group, Bhingri, Pyuthan.**

**Meen Bahadur Bhatta, Vegetable and Fruit Farmer, Bijuwar, Pyuthan.**

**Meena Paudyal, Women Dev. Officer, Pyuthan.**

**Meen Raj Pokharel, JT, Agriculture Services Sub-centre, Bhingri, Pyuthan.**

**Min Bahadur K.C., Farmer, Bijuwar, Pyuthan.**

**Mohammad Illiyas Khan, Acting DADO, Pyuthan.**

**Mohan Lal Gharti, Chairman, Water User's Committee, Bhirpani-**

**Mukunda Raj Bhatta, Farmer, Radish Seed Multiplication Program, Bijuwar, Pyuthan.**

**Nanda Lal Chaudhary, Assistant Livestock Development Officer, DADO, Pyuthan.**

**Nareswor Acharya, VFC Site Co-ordinator, Bijuwar, Pyuthan.**

**Neelkhanta Bhandari, Farmer Group Bhingri, Pyuthan**

**Netra Bahadur Rokaya, Chairman, VDC, Bhingri, Pyuthan**

**Nilkantha Adhikary, Chairman, Vegetable Group Nayagaon, Pyuthan.**

**Nim Bahadur Pun, JTA, Service Centre, Devasthan, Pyuthan.**

**P.P.Rizal, Member DDC, Pyuthan.**

**Padma Adhikari, Women Livestock Group, Bhingri, Pyuthan**

**Pavitra Adhikary, Women Farmer Group, Bhingri, Pyuthan**

**Prem Bahadur Hamal, JTA, Bijuwar, Pyuthan.**

**Ram Lal Shrestha, Chairman Water Committee, and Irrigation Scheme, CARE/N, Bhingri, Pyuthan**

**Ram Chandra Pokhrel, JTA, Bijuwar, Pyuthan.**

**Ramesh Thapa, DDC Member, Pyuthan.**

**Rebata Karki, Women Group, Bhingri, Pyuthan**

**Shree Laxmi Rajbhandary, Chairman, Janjyoti Samuhik Bikash Kendra, Bijuwar, Pyuthan.**

**Shyam Bahadur Karki, Chairman, Nayagaon VDC, Pyuthan.**

**Surya Dojhi, JT, Bijuwar, Pyuthan.**

**Tej Bahadur Karki, Women Forestry Group, Bhingri, Pyuthan.**

**Tek Bahadur Karki, Farmer, Vegetable Group Nayagaon, Pyuthan.**

**Thaneshor Regmi, Technical Assistant, SC, Bhingri, Pyuthan.**

**Uma Ram Paudel, Chairman VDC, Ward No 8, Pyuthan.**

**Yosoda Adhikary, Women Farmer Group, Bhingri, Pyuthan**

## **ROLPA**

**Amber Bahadur Khatri, Farmer, Jinabang VDC, BadaDunga, Ward No. 4, Rolpa.**

**Arjun Bahadur Oli, Jinabang VDC, Kukurghare, Ward No. 5, Rolpa.**

**Babu Ram Neupane, JTA. (Livestock), Service Centre, Sulichaur, Rolpa**

**Bhedi Raj Khatri, Farmer, Jinabang VDC, BadaDunga, Ward No. 4, Rolpa.**

**Bhim Bahadur Oli, Bhim Fruit Plant Production Farm, Bada Dunga, Jinabang, Rolpa.**

**Bhupendra Khatri, Farmer, Jinabang VDC, BadaDunga, Ward No 4 Rolpa.**

**Bipin Bahadur Kuwar, VDC Secretary, Mebang, Rolpa.**

**Bir Bahadur Khatri, Farmer, Jinabang VDC, BadaDunga, Ward No. 4, Rolpa.**

**Chandra Prakash Oli, Farmer, Jinabang VDC, BadaDunga, Ward No. 4, Rolpa.**

**Chitra Bahadur Khadka, JTA, DADO, Rolpa.**

**Damoder Santoshi, Chairman, Livestock, Farmers, Group, Libang, Rolpa.**

**Dhan Bahadur Gharti, Chairman, Forest User Group and Member of VDC, Rolpa.**

**Dighamber Bahadur Chaudhary, JTA, DADO, Rolpa.**

**Dil Kumar Giri, Chairperson of Vegetable Production Women Group (No.5), Chhakri, Budagaon, Rolpa.**

**Dilli Bahadur Khatri, Farmer, Jinabang VDC, BadaDunga, Ward No. 4, Rolpa.**

**Dorna Bahadur K.C., Farmer, Jinabang VDC, BadaDunga, Ward No. 4, Rolpa.**

**Ghamanda Bahadur Oli, Jinabang VDC, Kukurghare, Ward No. 5, Rolpa.**

**Gopal Hari Sharma, Soil Conservation Officer, Rolpa.**

**Hari Prasad Rokka, Farmer, Khumel, Rolpa.**

**Hari Prasad Acharya, Chairman, Livestock, Farmers, Group, Libang**

**Hasta Bahadur Gharti, Farmer, Chhakri, Budagaon, Rolpa.**

**Hom Lal Dangi, Member, Seed Multiflication and Fuffalo Group, Thalibang, Rolpa.**

**Hukum Prasad Acharya, Farmer, Thalibang, Rolpa**

**Indra Bahadur Khatri, Chairman, Shri Shramajivi Krishi Uddyammi Group, Jinabang VDC, Rolpa.**

**Indra Bahadur Dargi, Farmer, Thalibang, Rolpa**

**Janak Ram Bhandary, JT, District Livestock Office, Libang**

**Jhaggu Prasad Subedi, Chairman, DDC, Rolpa.**

**Kashi Ram Khatri, Farmer, Jinabang VDC, BadaDunga, Ward No. 4, Rolpa.**

**Khem Nath Sharma Paudyal, Local Development Officer, Libang.**

**Khim Bahadur Thapa, JT. Service Centre, Sulichaur, Rolpa**

**Krishna Sharma Paudyal, Program Officer, DDC, Rolpa**

**Krishna Prasad, Upadhaya, Chairman, Livestock Farmers Group, Libang**

**Kul Bahadur Oli, Jinabang VDC, Kukurghare, Ward No. 5, Rolpa.**

**Lal Singh Khatri, Farmer, Jinabang VDC, Bada Dunga, Ward No. 4, Rolpa.**

**Lal Bahadur Yogi, Chairman of Vegetable Production Group No.17 Chakri, Rolpa, and Member, Managing Committee, Kapurkot.**

**Leela Bahadur Buda, Member, DDC, Rolpa**

**Mahabir Khatri, Farmer, Jinabang VDC, BadaDunga, Ward No 4 Rolpa.**

**Nanda Bahadur Dangi, Farmer, Thalibang, Rolpa.**

**Nandi Gharti, Member, Vegetable Production Women Group, Chhakri, Budagaon, Rolpa.**

**Nara Bahadur Kunwar, Wheat Demonstrator, Mehbang, Rolpa**

**Nim Bahadur Singh, JTA (Livestock) Thalibang, Rolpa.**

**Parbati Rana, Teacher, Adult Literacy Program, Mehbang.**

**Parshu Ram Gharti Magar, DDC, Rolpa.**

**Purna Bahadur K.C., Farmer, Jinabang VDC, BadaDunga, Ward No. 4, Rolpa.**

**Ram Chandra Yadav, Ranger, Ranger Office, Rolpa.**

**Ram Bahadur Khatri, Farmer, Jinabang VDC, BadaDunga, Ward No. 4, Rolpa.**

**Ram Hari Shahi, Agriculture Inputs Corporation, Sub-Branch Office, Libang**

**Rana Bahadur Sen, Chairman, Livestock, Farmers Group, Libang.**

**Shahi Ram Dangi, DDC, Rolpa**

**Sher Bahadur Khatri, Farmer, Jinabang VDC, BadaDauga, Ward No 4 Rolpa.**

**Sher Bahadur Oli, Jinabang VDC, Kukurghare, Ward No. 5, Rolpa.**

**Shiv Ram Khatri, Farmer, Jinabang VDC, BadaDunga, Ward No. 4, Rolpa.**

**Shiva Pd. Acharya, Chairman, Livestock Farmers Group, Libang**

**Shiva Raj Pokheral, Chairman, Community Forestry Users Group, Mehsang, Rolpa**

**Shoba Shah, Women Development Officer, Rolpa**

**Shree Prakash Acharya Secretary, Rolpa.**

**Silaram Dangi, Chairman, Seed Multiflication and Buffalo Group, Thalibang, Rolpa.**

**Sita Ram Dargi, Farmer, Thalibang, Rolpa**

**Surbir Khatri, Farmer, Jinabang VDC, BadaDunga, Ward No. 4, Rolpa.**

**Tej Bahadur Kunwar, Chairman, Community Forestry Users Group, Mehsang, Rolpa**

**Tek Bahadur Mehra, Chairman, Community Forestry Users Group, Mehsang, Rolpa**

**Tek Narayan Chaudhary, Ranger, Community Forestry Users Group, Mehsang, Rolpa**

**Tek Narayan Acharya, Ranger, DFO, Rolpa.**

**Tekam Prasad K.C., Farmer, Jinabang VDC, BadaDunga, Ward No. 4, Rolpa.**

**Tirtha Bahadur Rajauriya, Agriculture Development Bank, Libang**

**Tritha Raj Paudel, JT, Dist. Agri. Dev. Office, Rolpa.**

**Tulsa Pokharel, Vegetable Farmer, Community Forestry Users Group, Mehsang, Rolpa.**

**Udaya Sing Buda, Member Forest User Group, Rhuga, Rolpa.**

**Yadav Dhital, Forestry officer, Rolpa**

**Yagya Bikram Malla, Chairman, Livestock Farmers Group, Libing, Rolpa.**

## **SALYAN**

**Abdul Rehman Kaji, Trader of Fruit and Vegetable, Kapurkot, Salyan.**

**Arjun Prasad Gautam, Local Development Officer, Salyan.**

**Ashok Kumar Shrestha, Chief, Small Farmer's Development Program, Kapurkot, Salyan.**

**Birendra Lal Karna, JTA, Agriculture Service Centre, Kapurkot, Salyan.**

**Bishnu Bahadur Bhandari, Farmer, Barela, Kajeri VDC, Salyan.**

**Budhi Ram, Vice-Chairman, Sejuwal Takura VDC, Salyan.**

**Chaabi Lal Rawat, Fruit Farmer, Sejuwal Takura VDC, Dulara Pokhara, Khalanga, Salyan.**

**Dhruba Raj Puri, Chairman, Salyan District Development Committee.**

**Dipendra Keshari Neupane, Assistant Plant Pathologist, Ginger Research Program, Kapurkot, Salyan.**

**Fateh Bahadur Badathoki, Vegetable Farmer, Danabang-2, Moolpani, Salyan.**

**Fauda Bahadur Khadga, Citrus Farmer, Damachaur VDC, Ward no 3, Dandikhola, Salyan.**

**Ganesh Chand, Vice-Chairman, Salyan District Development Committee.**

**Govind Bahadur Bhandari, Farmer, Barela, Kajeri VDC, Salyan.**

**Hare Ram Nepal, Agriculture Development Officer, Salyan.**

**Hari Lal Giri, District Soil Conservation Officer, Salyan.**

**Harihar Sharma Gyawali, Chief District Officer, Salyan.**

**Harsha Singh Oli, Vegetable Farmer, Darimjeula, Jhimpe, Salyan.**

**Hotaram Viswakarma, Vegetable Farmer, Darimjeula, Jhimpe, Salyan.**

**Iswari Prasad Sharma, Chairman, Himali Fruit and Off-season Vegetable Production Association Management Centre, Salyan.**

**Kesh Bahadur Bista, Vegetable Farmer, Darimjeula, Jhimpe, Salyan.**

**Lal Narayan Singh, District Forest Officer, Salyan.**

**Lok Bahadur Bhandari, Farmer, Barela, Kajeri VDC, Salyan.**

**Man Bahadur Buda, Trader and Member of Managing Committee, Kapurkot, Salyan.**

**Pokh Raj Chand, Member, Salyan District Development Committee.**

**Pokhar Singh Dangi, Member, DDC, Salyan (as well as Chairman, Sharda Forest User's Committee).**

**Prithwi Bahadur Oli, Vegetable Farmer, Darimjeula, Jhimpe, Salyan.**

**Raj Kishor Yadav, JTA (Veterinary) Agriculture Service Centre, Shankhamul, Salyan.**

**Rita Ram Basnet, Apple Grower, Burase, Damachaur VDC, ward no 9, Salyan.**

**Rup Lal Bhandari, Farmer, Barela, Kajeri VDC, Salyan.**

**Shyam Regmi, Vegetable Farmer, Ghopteambre, Salyan.**

**Tej Bahadur Bhandari, Vegetable Seed Grower, Barela Kajeri VDC, Salyan, as well as Chairman of Vegetable Seed Production Group, Barela.**

**Thakur Prasad Basnet, Citrus Grower and Nurseryman, Ward No 1, Khalanga, Salyan.**

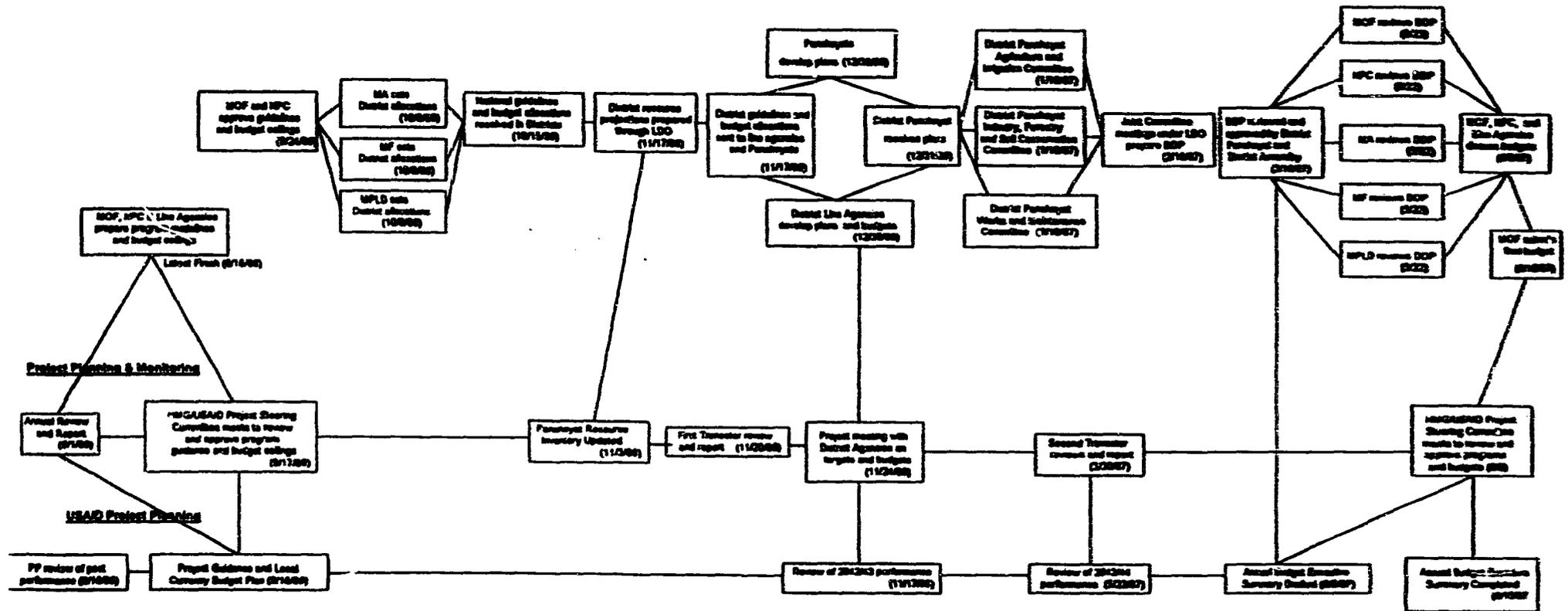
**Tulasa Acharya, Women Development Office, Salyan.**

**Wim Den Hertog, SNV in D.F.O. Office, Salyan.**

**Yam Raj Pandey, Incharge, Ginger Research Program, Kapurkot, Salyan.**

**Yudha Bahadur Viswakarma, Farmer, Barela, Kajeri VDC, Salyan.**

**Annex 4. Planning and Monitoring Processes Within the Organizational Structure Rapti Development Project (367-0155)**



**MOF District Planning Process**

- MOF = Ministry of Finance
- NPC = National Planning Commission
- MA = Ministry of Agriculture
- MF = Ministry of Forestry
- MPLD = Ministry of Parshayat and Local Development
- LDO = Local Development Office
- DDP = District Development Plan

Source: Project Coordinator Offices, Rapti Development Project, Tulsipur.

## **Annex 5**

### **Area, Production and Yield of Cereals and Cash Crops**

#### **TABLE OF CONTENTS**

- Table 1. Production of Cereal and Cash Crops in Hills
- Table 2. Area of Cereal & Cash Crops in Hills
- Table 3. Yield of Cereal Crops & Cash Crops in Hills
- Table 4. Production of Cereal & Cash Crops in Terai
- Table 5. Area of Cereal Crops & Cash Crops in Terai
- Table 6. Yield of Cereal Crops & Cash Crops in Terai
- Table 7. Production of Cereal Crops & Cash Crops in Dang District
- Table 8. Area of Cereal Crops & Cash Crops in Dang District
- Table 9. Yield of Cereal Crops & Cash Crops in Dang District
- Table 10. Production of Cereal Crops & Cash Crops in Rolpa District
- Table 11. Area of Cereal Crops & Cash Crops in Rolpa District
- Table 12. Yield of Cereal Crops & Cash Crops in Rolpa District
- Table 13. Production of Cereal Crops & Cash Crops in Salyan District
- Table 14. Area of Cereal Crops & Cash Crops in Salyan District
- Table 15. Yield of Cereal Crops & Cash Crops in Salyan District
- Table 16. Production of Cereal Crops & Cash Crops in Rukum District
- Table 17. Area of Cereal Crops & Cash Crops in Rukum District
- Table 18. Yield of Cereal Crops & Cash Crops in Rukum District
- Table 19. Production of Cereal Crops & Cash Crops in Pyuthan District
- Table 20. Area of Cereal Crops & Cash Crops in Pyuthan District
- Table 21. Yield of Cereal Crops & Cash Crops in Pyuthan District
- Table 22. Production of Cereal Crops & Cash Crops in 4 Hill District of Rapti Zone
- Table 23. Area of Cereal Crops & Cash Crops in 4 Hill District of Rapti Zone
- Table 24. Yield of Cereal Crops & Cash Crops in 4 Hill District of Rapti Zone
- Table 25. Average production of Cereal Crops & Cash Crops in 4 Hill of Rapti Zone
- Table 26. Average area of cereal Crops & Cash Crops in 4 Hill of Rapti Zone
- Table 27. Average Yield of Cereal Crops & Cash Crops in 4 Hill of Rapti Zone

**Table 1. Production of Cereal and Cash Crops in Hills**  
(metric tons)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage</i> <i>increase</i> <i>c=(b/a*100)</i>	<i>1988/89-90/91</i> (d)	<i>Percentage</i> <i>increase</i> <i>e=(d/c*100)</i>
Rice	791,902.00	675,902.33	-14.65	785,292.33	16.18
Maize	868,525.00	699,678.00	-19.44	112,083.00	16.06
Wheat	203,130.00	252,170.00	24.14	298,925.00	18.54
Potato	227,792.00	257,964.33	13.24	343,587.67	33.19
Oilseed	13,969.33	17,029.67	21.91	18,515.00	8.72

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 2. Area of Cereal and Cash Crops in Hills**  
(hectares)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage</i> <i>increase</i> <i>c=(b/a*100)</i>	<i>1988/89-90/91</i> (d)	<i>Percentage</i> <i>increase</i> <i>e=(d/c*100)</i>
Rice	339,299.67	341,227.67	0.57	343,699.67	0.72
Maize	506,056.33	519,566.67	2.67	533,912.33	2.76
Wheat	179,089.33	227,193.33	26.86	243,501.33	7.18
Potato	42,263.00	43,653.33	3.29	46,213.67	5.86
Oilseed	28,011.00	28,145.00	0.48	29,007.33	3.06

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 3. Yield of Cereal Crops and Cash Crops in Hill**  
(kilogram/hectares)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage</i> <i>increase</i> <i>c=(b/a*100)</i>	<i>1988/89-90/91</i> (d)	<i>Percentage</i> <i>increase</i> <i>e=(d/c*100)</i>
Rice	2,334.33	1,980.66	-15.15	2,284.66	15.35
Maize	1,716.66	1,346.66	-21.55	1,521.00	12.95
Wheat	1,132.33	1,111.66	-1.82	1,227.66	10.43
Potato	5,389.33	5,913.66	9.73	7,430.33	25.66
Oilseed	498.66	605.00	21.32	638.00	5.45

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 4. Production of Cereal Crops and Cash Crops in Terai**  
(metric tons)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage</i> <i>increase</i> <i>c = (b/a*100)</i>	<i>1988/89-90/91</i> (d)	<i>Percentage</i> <i>increase</i> <i>e = (d/c*100)</i>
Rice	1838,086.3	2164,737.7	17.77	2535,824.7	17.14
Maize	244,329.67	257,482.00	5.38	288,101.67	11.89
Wheat	265,419.00	386,978.33	45.80	497,017.33	28.43
Potato	10,156.33	105,045.67	3.42	203,384.00	93.61
Oilseed	73,185.00	77,345.33	5.68	75,634.66	-2.11

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 5. Area of Cereal Crops and Cash Crops in Terai**  
(hectares)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage</i> <i>increase</i> <i>c = (b/a*100)</i>	<i>1988/89-90/91</i> (d)	<i>Percentage</i> <i>increase</i> <i>e = (d/c*100)</i>
Rice	1,061,831.7	1,068,561.3	0.63	1,068,042.7	-0.05
Maize	154,603.33	156,014.67	0.91	161,739.33	3.67
Wheat	244,154.00	286,959.68	17.53	313,143.33	9.12
Potato	17,151.66	17,376.66	1.31	18,266.33	5.12
Oilseed	112,547.67	121,667.00	8.10	121,900.67	0.19

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 6. Yield of Cereal Crops and Cash Crops in Terai**  
(kilogram/hectares)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage</i> <i>increase</i> <i>c = (b/a*100)</i>	<i>1988/89-90/91</i> (d)	<i>Percentage</i> <i>increase</i> <i>e = (d/c*100)</i>
Rice	1,731.00	2,026.00	17.04	2,374.00	17.18
Maize	1,580.33	1,650.33	4.43	1,781.33	7.94
Wheat	1,086.00	1,348.33	24.15	1,587.33	17.72
Potato	5,908.33	6,049.33	2.37	11,127.00	83.94
Oilseed	649.66	636.00	-2.10	620.33	-2.46

Source : Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 7. Production of Cereal Crops and Cash Crops in Dang District (metric tons)**

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage increase</i> $c = (b/a * 100)$	<i>1988/89-90/91</i> (d)	<i>Percentage increase</i> $e = (d/c * 100)$
Rice	61,487.00	67,010.66	8.98	89,470.66	33.52
Maize	32,776.00	27,997.00	-14.58	37,444.66	33.74
Wheat	12,978.00	18,443.00	42.11	28,837.66	56.36
Potato	3,966.00	4,454.00	12.30	6,854.33	53.89
Oilseed	14,874.00	12,240.66	-17.71	11,599.33	-5.23

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 8. Area of Cereal Crops and Cash Crops in Dang District (hectares)**

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage increase</i> $c = (b/a * 100)$	<i>1988/89-90/91</i> (d)	<i>Percentage increase</i> $e = (d/c * 100)$
Rice	32,024.33	33,590.00	4.89	36,533.33	8.75
Maize	207,050.00	20,073.33	-3.26	20,485.00	2.05
Wheat	12,661.66	13,660.00	7.88	18,186.66	33.14
Potato	670.00	738.33	10.20	775.00	4.97
Oilseed	18,404.33	14,786.66	-4.99	18,016.66	3.03

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 9. Yield of Cereal Crops and Cash Crops in Dang District (kilogram/hectares)**

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage increase</i> $c = (b/a * 100)$	<i>1988/89-90/91</i> (d)	<i>Percentage increase</i> $e = (d/c * 100)$
Rice	1,920.00	1,994.66	3.89	2,449.00	22.78
Maize	1,579.66	1,395.00	-11.69	1,827.66	31.01
Wheat	1,023.66	1,350.00	314.82	1,585.66	17.46
Potato	5,920.00	6,033.33	1.91	8,833.33	17.46
Oilseed	808.00	700.00	-13.37	643.33	-8.09

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 10. production of Cereal Crops and Cash Crops in Rolpa District  
(metric tons)**

<i>Crop</i>	<i>1976/77-78/79</i> <i>(a)</i>	<i>1983/84-85/86</i> <i>(b)</i>	<i>Percentage</i> <i>increase</i> <i>c=(b/a*100)</i>	<i>1988/89-90/91</i> <i>(d)</i>	<i>Percentage</i> <i>increase</i> <i>e=(d/c*100)</i>
Rice	10,993.66	6,624.00	-39.75	8,803.00	32.89
Maize	13,907.66	12,936.00	-6.19	15,553.00	20.23
Wheat	4,413.33	6,645.00	50.57	7,987.66	20.20
Potato	7,278.00	8,208.00	12.78	9,301.33	13.32
Oilseed	18.23	28.16	54.47	34.23	21.55

*Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).*

**Table 11. Area of Cereal Crops and Cash Crops in Rolpa District  
(hectares)**

<i>Crop</i>	<i>1976/77-78/79</i> <i>(a)</i>	<i>1983/84-85/86</i> <i>(b)</i>	<i>Percentage</i> <i>increase</i> <i>c=(b/a*100)</i>	<i>1988/89-90/91</i> <i>(d)</i>	<i>Percentage</i> <i>increase</i> <i>e=(d/c*100)</i>
Rice	4,639.33	4,617.00	-0.48	4,805.00	4.07
Maize	7,731.00	8,824.00	14.14	10,550.00	19.56
Wheat	5,283.66	7,377.33	39.62	8,146.66	10.43
Potato	1,373.00	1,368.00	-0.36	1,395.33	1.99
Oilseed	46.23	56.33	21.58	56.33	0

*Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).*

**Table 12. Yield of Cereal Crops and Cash Crops in Rolpa District  
(kilogram/hectares)**

<i>Crop</i>	<i>1976/77-78/79</i> <i>(a)</i>	<i>1983/84-85/86</i> <i>(b)</i>	<i>Percentage</i> <i>increase</i> <i>c=(b/a*100)</i>	<i>1988/89-90/91</i> <i>(d)</i>	<i>Percentage</i> <i>increase</i> <i>e=(d/c*100)</i>
Rice	2,369.66	1,434.70	-39.45	1,832.05	27.69
Maize	1,798.95	1,466.00	-18.51	1,474.22	0.56
Wheat	835.28	900.73	7.84	980.48	8.85
Potato	5,300.80	6,000.00	13.19	6,666.04	11.10
Oilseed	393.48	499.91	27.05	607.67	21.55

*Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).*

**Table 13. Production of Cereal Crops and Cash Crops in Salyan District**  
(metric tons)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage increase</i> $c = (b/a * 100)$	<i>1988/89-90/91</i> (d)	<i>Percentage increase</i> $e = (d/c * 100)$
Rice	12,358.66	8,452.00	-31.61	11,403.33	34.92
Maize	35,845.33	26,732.00	-25.42	29,099.00	8.85
Wheat	12,242.00	11,300.66	-7.69	14,898.00	31.83
Potato	2,281.00	3,015.66	32.21	4,613.33	52.98
Oilseed	448.56	509.13	13.50	536.00	5.28

*Source:* Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 14. Area of Cereal Crops and Cash Crops of Salyan District**  
(hectares)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage increase</i> $c = (b/a * 100)$	<i>1988/89-90/91</i> (d)	<i>Percentage increase</i> $e = (d/c * 100)$
Rice	5,282.66	5,500.00	4.11	5,900.00	7.27
Maize	20,853.66	20,699.33	-0.74	26,973.66	1.32
Wheat	10,635.66	13,056.33	22.76	14,863.33	13.84
Potato	420.00	514.66	22.54	586.66	13.99
Oilseed	963.33	1,003.66	4.19	1,001.33	-0.23

*Source:* Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 15. Yield of Cereal Crops and Cash Crops in Salyan District**  
(kilogram/hectares)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage increase</i> $c = (b/a * 100)$	<i>1988/89-90/91</i> (d)	<i>Percentage increase</i> $e = (d/c * 100)$
Rice	2,339.48	1,536.73	-34.31	1,932.77	25.77
Maize	1,718.90	1,291.44	-24.87	1,387.41	7.43
Wheat	1,151.03	865.53	-24.86	1,002.33	15.80
Potato	5,430.95	5,859.52	7.89	7,863.72	34.20
Oilseed	465.63	507.27	8.94	535.29	5.52

*Source:* Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 16. Production of Cereal Crops and Cash Crops in Rukum District**  
(metric tons)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage</i> <i>increase</i> $c = (b/a * 100)$	<i>1988/89-90/91</i> (d)	<i>Percentage</i> <i>increase</i> $e = (d/c * 100)$
Rice	8,477.33	9,532.00	12.44	8,993.66	-5.65
Maize	28,739.33	18,150.66	-36.84	26,302.33	44.91
Wheat	4,909.33	7,792.33	58.72	9,705.66	24.55
Potato	7,453.33	7,501.33	0.64	10,581.00	41.05
Oilseed	266.73	331.90	24.43	366.66	10.47

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 17. Area of Cereal Crops and Cash Crops of Rukum District**  
(hectares)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage</i> <i>increase</i> $c = (b/a * 100)$	<i>1988/89-90/91</i> (d)	<i>Percentage</i> <i>increase</i> $e = (d/c * 100)$
Rice	3,801.00	4,460.00	17.34	4,742.33	6.33
Maize	16,106.33	15,947.00	-0.99	17,783.33	11.51
Wheat	6,574.33	8,645.66	31.51	10,056.33	16.32
Potato	1,516.00	1,323.33	-78.67	1,466.33	10.81
Oilseed	697.33	663.66	-4.83	680.00	2.46

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 18: Yield of Cereal Crops and Cash Crops in Rukum District**  
(kilogram/hectares)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage</i> <i>increase</i> $c = (b/a * 100)$	<i>1988/89-90/91</i> (d)	<i>Percentage</i> <i>increase</i> $e = (d/c * 100)$
Rice	2,230.28	2,137.22	-4.17	1,896.46	-11.26
Maize	1,784.35	1,138.19	-36.21	1,479.04	64.10
Wheat	746.74	901.30	20.70	965.13	7.08
Potato	4,916.44	5,668.52	15.30	7,215.97	27.30
Oilseed	382.50	500.10	30.75	539.20	7.82

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 19. Production of Cereal Crops and Cash Crops in Pyuthan District**  
(metric tons)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage increase</i> $c = (b/a * 100)$	<i>1988/89-90/91</i> (d)	<i>Percentage increase</i> $e = (d/c * 100)$
Rice	13,131.00	9,741.33	-25.81	11,663.66	19.73
Maize	17,013.00	11,476.33	-32.54	15,090.00	2.74
Wheat	9,134.33	7,537.66	-17.47	9,567.33	26.93
Potato	2,220.00	2,287.33	3.03	3,366.66	47.19
Oilseed	310.56	344.13	10.77	293.30	-14.77

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 20. Area of Cereal Crops and Cash Crops in Pyuthan District**  
(hectares)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage increase</i> $c = (b/a * 100)$	<i>1988/89-90/91</i> (d)	<i>Percentage increase</i> $e = (d/c * 100)$
Rice	5,235.00	5,178.66	-1.08	5,962.33	15.13
Maize	9,266.66	9,454.66	2.03	10,521.66	11.28
Wheat	7,860.33	7,853.33	-0.09	8,626.66	9.85
Potato	405.00	392.33	-3.13	460.00	17.25
Oilseed	708.33	638.00	-9.93	630.00	-1.25

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 21. Yield of Cereal Crops and Cash Crops in Pyuthan District**  
(kilogram/hectares)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage increase</i> $c = (b/a * 100)$	<i>1988/89-90/91</i> (d)	<i>Percentage increase</i> $e = (d/c * 100)$
Rice	2,508.31	1,881.05	-25.07	1,956.22	4.00
Maize	1,835.94	1,213.83	66.06	1,434.18	18.15
Wheat	1,162.08	959.80	-17.41	1,109.04	15.56
Potato	5,481.48	5,830.12	6.36	7,318.83	25.53
Oilseed	438.44	539.39	23.14	465.55	-13.69

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 22. Production of Cereal Crops and Cash Crops in 4 Hill District of Rapti Zone (metric tons)**

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage increase</i> $c=(b/a*100)$	<i>1988/89-90/91</i> (d)	<i>Percentage increase</i> $e=(d/c*100)$
Rice	45,140.65	33,749.33	-25.24	40,863.65	21.08
Maize	95,505.32	69,294.99	-27.44	82,617.99	9.23
Wheat	30,698.99	33,275.65	8.39	42,158.65	26.70
Potato	19,232.33	21,012.32	1.26	17,862.32	32.60
Oilseed	595.52	1,213.32	103.74	1,543.53	27.30

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 23. Area of Cereal Crops and Cash Crops in 4 Hill Districts of Rapti Zone (hectares)**

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage increase</i> $c=(b/a*100)$	<i>1988/89-90/91</i> (d)	<i>Percentage increase</i> $e=(d/c*100)$
Rice	18,957.99	19,755.66	4.21	21,409.66	8.37
Maize	53,957.65	54,924.99	1.79	59,828.65	8.93
Wheat	30,353.94	36,932.65	21.67	41,692.98	12.89
Potato	3,714.00	3,598.32	-3.11	3,908.32	8.62
Oilseed	2,415.32	2,361.65	-2.22	2,367.66	0.25

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 24. Yield of Cereal Crops and Cash Crops in 4 Hill Districts of Rapti Zone (kilogram/hectares)**

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage increase</i> $c=(b/a*100)$	<i>1988/89-90/91</i> (d)	<i>Percentage increase</i> $e=(d/c*100)$
Rice	9,447.73	5,989.70	-36.60	7,617.50	27.17
Maize	138.13	5,109.45	-28.42	4,483.85	-12.24
Wheat	3,895.13	3,627.37	-6.87	4,057.32	11.85
Potato	21,129.67	18,358.16	-13.12	22,064.56	20.19
Oilseed	1,680.06	2,046.68	21.82	2,147.71	4.94

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 25. Average Production of Cereal Crops and Cash Crops in 4 Hill Districts**  
(metric tons)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage increase</i> $c = (b/a * 100)$	<i>1988/89-90/91</i> (d)	<i>Percentage increase</i> $e = (d/c * 100)$
Rice	112,585.16	8,437.33	-25.24	10,215.91	21.08
Maize	23,876.33	17,323.75	-27.44	20,654.50	19.23
Wheat	7,674.75	8,318.91	8.39	10,539.66	26.70
Potato	4,808.08	5,283.08	9.26	6,965.58	32.60
Oilseed	148.88	303.33	103.74	385.88	27.21

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 26. Average Area of Cereal Crops and Cash Crops in 4 Hill Districts**  
(hectares)

<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage increase</i> $c = (b/a * 100)$	<i>1988/89-90/91</i> (d)	<i>Percentage increase</i> $e = (d/c * 100)$
Rice	4,739.50	4,938.92	4.21	5,352.42	8.37
Maize	13,489.25	13,731.25	1.79	14,957.16	8.93
Wheat	7,588.50	9,233.16	21.67	10,423.25	12.89
Potato	928.50	899.58	-3.11	977.08	8.61
Oilseed	603.83	590.41	-2.22	591.92	0.25

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

**Table 27. Average Yield of Cereal and Cash Crops in 4 Districts**  
(kilogram/hectares)

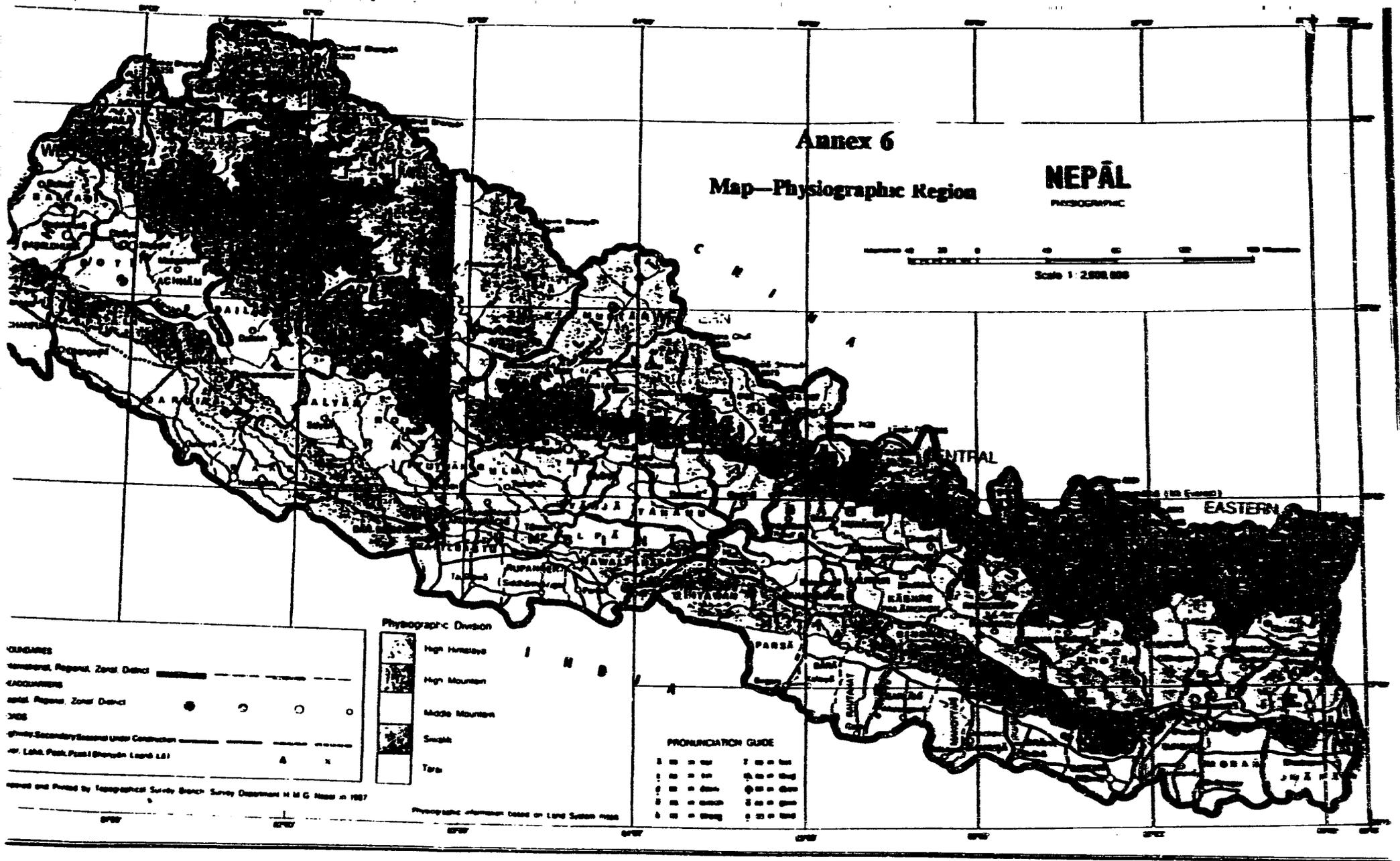
<i>Crop</i>	<i>1976/77-78/79</i> (a)	<i>1983/84-85/86</i> (b)	<i>Percentage increase</i> $c = (b/a * 100)$	<i>1988/89-90/91</i> (d)	<i>Percentage increase</i> $e = (d/c * 100)$
Rice	2,361.93	1,497.42	-36.60	1,904.38	27.18
Maize	1,784.53	1,277.36	-28.42	1,120.96	-12.24
Wheat	973.78	906.84	-6.87	1,014.33	11.85
Potato	5,282.42	4,589.54	-13.12	5,516.14	20.19
Oilseed	420.01	511.67	21.82	536.93	4.94

Source: Agricultural Statistics Revised cropped area series (1974/75-1991/92).

Annex 6

Map—Physiographic Region

NEPĀL  
PHYSIOGRAPHIC



**BOUNDARIES**

International, Regional, Zonal, District

Local, Regional, Zonal, District

State

Other Secondary Boundaries Under Construction

of, Lohit, Pashu, Pashu (Shorpuh, Lohit, Lohit)

**Physiographic Division**

- High Hills
- High Mountain
- Moderate Mountain
- Slope
- Tera

**PRONUNCIATION GUIDE**

३	aa	3	aa	aa
४	aa	४	aa	aa
५	aa	५	aa	aa
६	aa	६	aa	aa
७	aa	७	aa	aa

Revised and Printed by Topographical Survey Branch, Survey Department, H. M. G. Nepal in 1987

Physiographic information based on Land System maps